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A REVISION OF THE DIPTEROUS FAMILY

RHAGIONIDAE

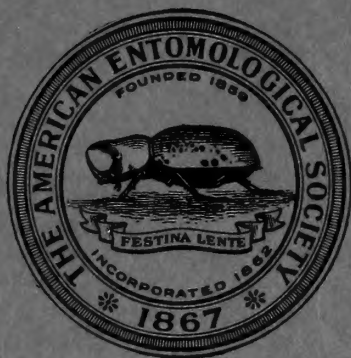
(LEPTIDAE)

IN THE

UNITED STATES AND CANADA

BY

MORTIMER DEMAREST LEONARD



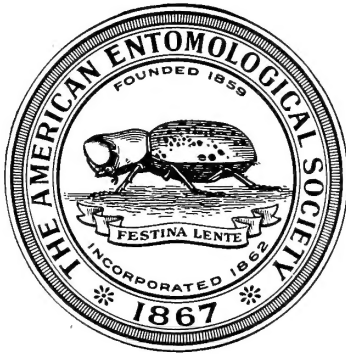
PUBLISHED BY THE AMERICAN ENTOMOLOGICAL SOCIETY
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INTRODUCTION

The present paper is an attempt to bring together for the first time a complete synopsis of the comparatively little known dipterous family Rhagionidae (Leptidae) as it occurs in the United States and Canada.

The study was commenced some years ago under the direction of Dr. J. Chester Bradley of Cornell University as partial fulfillment of the requirements for the degree of Doctor of Philosophy. It was later completed, after many interruptions, under Dr. O. A. Johannsen of Cornell.

Although keys have previously been published for the separation of four (*Chrysopilus*, *Rhagio* (*Leptis*), *Xylomyia*, and *Xylophagus*, of the seventeen regional genera they have been based to a considerable extent on descriptions and contain more or less serious errors. But a single genus, *Symphoromyia*, has been revised by Dr. J. M. Aldrich (1915); even to this paper I have been able to make a few corrections and additions.

Most of the species are not common and this group of flies has been comparatively little collected or studied by entomologists. An attempt has been made to examine all of the specimens in all of the collections in the United States and Canada. This has been successful, I believe, to a marked degree. Nearly fifty collections belonging to public museums and private workers have been studied. Among the more important of these are:

American Museum of Natural History, New York, New York.
[A. M. N. H.].

- Nathan Banks, Cambridge, Massachusetts. [Banks].
- Jos. Bequaert, Harvard Medical School, Boston, Massachusetts. [Bequaert].
- Boston Society of Natural History, Boston, Massachusetts. [B. S. N. H.].
- Museum of the Brooklyn Institute of Arts and Sciences, Brooklyn, New York. [Brook. Mus.].
- E. J. Burns, Staten Island, New York. [Burns].
- California Academy of Science, San Francisco, California. (Cal. A. S.).
- Canadian National Museum, Ottawa, Canada. [C. N. M.].
- F. R. Cole, Redlands, California. [Cole].
- Cornell University, Ithaca, New York. [C. U.].
- Wm. T. Davis, Staten Island, New York. [Davis].
- University of Illinois, Urbana, Illinois. [U. of Ill.].
- Charles W. Johnson, Boston, Massachusetts (now in the M. C. Z.). [Johnson].
- University of Kansas, Lawrence, Kansas. [U. of K.].
- Kansas Agricultural College, Manhattan, Kansas. [Kansas].
- M. D. Leonard, in Cornell University, Ithaca, New York. [Leonard].
- Maine Agricultural Experiment Station, Orono, Maine. [Maine A. E. S.].
- A. L. Melander, New York University, New York City, N. Y. [Melander].
- University of Minnesota, St. Paul, Minnesota. [U. of Minn.].
- Museum of Comparative Zoology, Cambridge, Massachusetts. [M. C. Z.].
- Nebraska Agricultural Experiment Station, Lincoln, Nebraska. [Nebraska].
- New York State Museum, Albany, New York. [N. Y. S. M.].
- North Carolina Department of Agriculture, Raleigh, North Carolina. [No. Car.].
- Ohio State University, Columbus, Ohio. [Ohio U.].
- Ontario Agricultural College, Guelph, Ont., Canada. [Ont. Agr. College].
- Academy of Natural Sciences, Philadelphia, Pennsylvania. [A. N. S. P.].

Pomona College, Claremont, California.

R. C. Shannon, Washington, District of Columbia. [Shannon].

University of Toronto, Toronto, Canada.

Stanford University, Palo Alto, California. [Stanford U.].

Staten Island Public Museum, Staten Island, New York.

United States Biological Survey, Washington, District of Columbia. [Biol. Surv.].

United States National Museum, Washington, District of Columbia. [U. S. N. M.].

M. C. Van Duzee, Buffalo, New York. [Van Duzee].

The abbreviation in brackets [] after certain of the above is that used with the distribution of each species. The names of the remainder of the collections are so abbreviated in the text as to be obvious.

Nearly six thousand specimens have been examined during the course of the present study. With this wealth of material it has been possible to straighten out many questionable matters; nevertheless in some species much more material will be necessary before their true limits can be fully understood.

One hundred and twenty three species and varieties distributed in seventeen genera, are treated in this paper. A few of these, however, it has not been possible to redescribe since they have not been rediscovered since they were first recognized; in such cases the original description has been copied or a translation of it is given. Eight of the species and three varieties are herein described as new.

Unless otherwise specified the characterization of the family and the brief generic diagnoses are based only on characters exhibited in species occurring in the United States and Canada. I believe, however, that the essential characters of these groups are given and that only minor changes or corrections would have to be made in most cases, to include European or exotic forms. General remarks in regard to life-history or habits of the species also include only regional forms, unless it is stated to the contrary.

Little is known concerning the immature stages and still less about the life history of the Rhagionidae particularly when compared with many other families of flies. Such information as has been accumulated, along with new facts, has been brought to-

gether by J. R. Malloch (1917) in his excellent paper on the classification of Diptera, based on larval and pupal characters. In a later paper Mr. C. T. Greene (1926) in his "Descriptions of Larvae and Pupae of Two-winged Flies Belonging to the Family Leptidae," has added considerably to our knowledge of the immature stages of these flies by accurate descriptions and by his well-known line drawings of the larvae and pupae of several species.

The adults are usually found in meadows or in open woods, frequently in the vicinity of a stream. They rest upon the leaves of low shrubs or, head downward, upon stems or tree trunks. Some species, however, are found on the foliage of weeds and in low grass. They are sometimes collected by sweeping in such situations but more frequently the insects are first observed to alight or to be already at rest, and are then caught in the net. They are for the most part rather sluggish flies and easily captured, though some species are more active than others. Occasionally they are predaceous upon other insects. Species of *Symphoromyia* suck the blood of man and are sometimes painful biters.

The larvae are undoubtedly to a great extent predaceous and live in a variety of situations. Some species pass their larval stages in the soil, in decaying wood, or in the passages of wood-boring beetles. *Atherix* lays its eggs in great masses over water, made up of the eggs of many individuals whose dead bodies remain on the egg-mass and come to form part of it. The larvae upon hatching drop into the water and there complete their development. The larvae of *Vermileo* make pits in the sand much after the manner of ant-lions and feed on the insects which fall therein. *Coenomyia* has been observed to feed on white grubs.

The author has attempted to fully record throughout the text the names of collectors, determinors or others upon whom he has drawn for information and data. Acknowledgement should here be made, however, to the authorities of all the institutions from which material for study was borrowed and to all of the private workers whose collections were studied. Only a part of these have been mentioned in the list of the more important collections studied. Special thanks are due to Dr. O. A. Johannsen, Dr. J. Chester Bradley and to Prof. C. R. Crosby, all of Cornell Uni-

versity for continued and constructive assistance and encouragement given during the interrupted course of this work. Professor Crosby has also supervised the final typing of copy in the author's absence. The generous assistance of Mr. Chas. W. Johnson by means of suggestions and the loan of specimens should be especially acknowledged, as well as that of Dr. J. M. Aldrich, and Prof. A. L. Melander. Special acknowledgement should be made to Mr. E. T. Cresson, Jr., for many suggestions as to arrangement of the manuscript, methods of citation, etc., and for his care in editing copy and arranging the plates.

CHARACTERS OF THE RHAGIONIDAE

Flies of moderate to large size usually more or less elongate and nearly bare to moderately pilose, rarely rather densely hairy, never, however, with distinct bristles. Males usually holoptic; more rarely dichoptic. Empodium pulvilliform, there being three pads of about equal size between the tarsal claws. (*Hilari-morpha* has no visible empodia and no discal cell but is usually referred to this family). Squamae small or vestigial. Antennae extremely variable: (a) segments of flagellum distinct, sometimes as many as thirty in number; (b) the segments not more than eight in number; more closely applied, without style or arista; (c) fewer in number with a differentiated segmented style or arista, altogether not more than eight; (d) the third segment simple with or without a dorsal or terminal arista. Veins of the wings distinct, not crowded anteriorly; third longitudinal cell furcate; basal cells large; five posterior cells usually present.

Possibly on the basis of the structure of the antennae, those genera grouped in the following table under the subfamilies Xylophaginae and Arthroceratinae should be placed in a family by themselves—the Xylophagidae—and the term Rhagionidae confined to what is here considered as the subfamily Rhagioninae. However, with the present evidence at hand and without making a more critical study of the family as a whole and its relation to the more closely allied families I do not feel qualified in making such a grouping. I am therefore following the precedent set by Williston in his "Manual" who divides all the genera referable to the Rhagionidae into three subfamilies.

Table of Subfamilies of Rhagionidae

1. Flagellum of antennae composed of numerous, more or less distinct divisions: the antennae more or less elongated.....2
 Antennae short or but little elongated, the third segment simple, with a terminal or dorsal arista or terminal style.....RHAGIONINAE, p. 55
2. Front tibiae with one terminal spurXYLOPHAGINAE, p. 6
 Front tibiae without spursARTHROCERATINAE, p. 36

Subfamily XYLOPHAGINAE

Table of Genera of the Subfamily Xylophaginae

1. Eyes pubescent; scutellum with two spine-like protuberances; the vein separating the fourth and fifth posterior cells distinctly arising from the distal cell.....**Coenomyia**, p. 6
 Eyes bare; scutellum without spines; the vein separating the fourth and fifth posterior cells arising either from the second basal cell or from the angle formed at the point of junction of the second basal cell with the discal cell.....2
2. Fourth posterior cell closed; flagellum of antennae with twenty to thirty-five segments, often pectinate; eyes emarginate just above antennae.
 Rachicerus, p. 10
 Fourth posterior cell open; flagellum of antennae with no more than eight segments, never pectinate; eyes not emarginate.....3
3. Flagellum of antennae tapering, acute at tip; vein separating the fourth and fifth posterior cells arising from the angle formed at the point of junction of the second basal cell with the discal cell; flies of rather robust appearance, the abdomen, especially in the male being somewhat oval. **Arthropeas**, p. 17
 Flagellum of antennae but little tapering, more truncate at tip; vein separating the fourth and fifth posterior cells normally arising from the second basal cell; flies of a more slender appearance, the abdomen, especially in the male, being long and narrow.....**Xylophagus**, p. 21

COENOMYIA Latreille

1796. *Coenomyia* Latreille, *Precis. d. Charact. Gen. Ins.*, p. 159 (no species included).

Robust flies in appearance with strongly arched thorax; head rather small as compared with thorax; in male eyes broadly contiguous, in female eyes separate but front narrower at vertex; eyes pubescent; antennae shorter than head, flagellum acute at tip, composed of about six segments; scutellum with two spine-like processes; tibial spurs 1:2:2; five posterior cells present, the veins separating them all distinctly arising from the discal cell.

GENOTYPE: *Musca ferruginea* Scopoli.

Coenomyia ferruginea Scopoli (Pl. I, fig. 7, Pl. II, fig. 8)

1763. *Musca ferruginea* Scopoli, Ent. Carniol., p. 340, no. 913.
 1787. *Musca olens* Herbst, Gemeinnutz Naturgesch., VIII, p. 108.
 1787. *Stratiomys testacea* Fabricius, Mantissa Insect., II, p. 330, no. 1.
 1787. *Stratiomys crucis* Fabricius, Mantissa Insect., II, p. 330, no 5..
 1792. *Musca crucis* Gmelin, Systema Naturae, v, p. 2834, no. 152.
 1792. *Musca australis* Gmelin, Systema Naturae, v, p. 2833, no. 149.
 1793. *Stratiomys macroleon* Panzer, Fauna Germ., IX, no. 29.
 1793. *Stratiomys unguiculata* Panzer, Fauna Germ., XII, p. 22.
 1794. *Stratiomys errans* Fabricius, Ent. Syst., IV, p. 263.
 1794. *Tabanus bispinosa* Fabricius, Ent. Syst., IV, p. 372, no. 41.
 1798. *Sicus ferrugineas* Fabricius, Suppl. Ent. Syst., p. 555, no. 2.
 1798. *Sicus bicolor* Fabricius, Suppl. Ent. Syst., p. 555, no. 3.
 1798. *Sicus crucis* Fabricius, Suppl. Ent. Syst., p. 555, no. 5.
 1803. *Stratiomys grandis* Schrank, Fauna Boica, III, p. 92, no. 2373.
 1803. *Stratiomys major* Schrank, Fauna Boica, III, p. 93, no. 2374.
 1803. *Stratiomys palatina* Schrank, Fauna Boica, III, p. 93, no. 2375.
 1804. *Sicus aurea* Meigen, Klassifikation, I, p. 122, no. b.
 1824. *Coenomyia pallida* Say, Long's Exped., 2, App. p. 369.
 1879. *Coenomyia cinereibarbis* Bigot, Ann. Soc. Ent. Fr., Ser. 5, IX, p. 194.

A characteristic species somewhat variable in color and markings but easily distinguished from all other snipe flies particularly by the pubescent eyes, the two spine-like processes on the scutellum and the fact that the four veins separating the posterior cells all arise from the discal cell; the head is small, especially in the female, as compared to the thorax which is noticeably convex above and the abdomen is broad and heavy, in the male often almost oval in outline. The female is in general brownish yellow, with the mesonotum usually darker and often with three indistinct dark brown stripes and almost bare or with short fine pale hairs. The male averages somewhat smaller and is dark brownish to almost blackish though some specimens are almost wholly brownish yellow including the legs; the mesonotum has usually much longer and denser hairs than in the female and often in certain lights two to four indistinct grayish pollinose stripes can be distinguished; abdomen usually with paler spots at sides and femora usually blackish. Wings of both sexes more or less tinged with yellowish or brownish especially along veins.

Male.—Length, 14 to 20 mm. Head: Ground color of face apparently black but overlaid with light brown pollen, sides of face with dense long-whitish hairs;

eyes broadly contiguous, distinctly pale or brownish pilose; palpi prominent, elongate, almost black, with fairly numerous whitish hairs; proboscis brownish yellow with a few whitish hairs at base below; beard whitish and occiput with numerous long whitish hairs; antennae brownish yellow, first segment cylindrical, almost three times as long as its diameter, the second and third sub-globose, the flagellum rather indistinctly divided into six or seven segments, tapering towards tip, the terminal segment elongate and ending in an acute point.

Thorax: Mesonotum brownish to blackish, subshining, rather densely clothed with moderately long, pale hairs; in the lighter individuals there are three broad dark brown stripes, in the darker ones these seem to be wholly obscured; when viewed from the side or behind in the proper light two distinct median light gray pollinose stripes can be plainly seen which extend caudad about two thirds the distance to the scutellum; scutellum brownish to blackish, subshining and with pale hairs, and armed with two stout blunt spine-like processes on the caudal margin; pleura brownish to dark brownish, in any given specimen somewhat lighter than the mesonotum, clothed with fairly dense, long pale hairs, somewhat unevenly distributed, thickest and longest on the metapleural swelling which is very pronounced; halteres yellowish; metanotum brownish to dark brownish, subshining, bare in the middle, with pale hairs on the sides.

Abdomen: Ovoid, shining, with numerous very fine short appressed hairs hardly visible except under the binocular; quite variable as to color and markings but in general as follows: almost uniformly yellowish brown, usually with all or at least the basal part of the first segment darker; in some specimens black with a large brownish yellow spot on the lateral margins of second and third segments; nearly all variations between these two extremes occur, a common form being those in which the caudal border of the third segment is narrowly brownish yellow with the fourth and remaining segments of the same color but with a large median basal spot and often a smaller one on each lateral margin of the fourth.

Legs: Coxae concolorous with pleura, with abundant long pale hairs; remainder of legs somewhat variable—in the darker specimens the femora are blackish with tibiae and tarsi brownish, usually with hind tibiae and tarsi almost blackish but occasionally they are darkened considerably on the other two pairs of legs; in the paler specimens the legs are often almost uniform brownish, the femora being little if any darker than the rest of the legs.

Wings: Membrane pale brownish to brownish yellow, usually darker along the costal margin and often somewhat so bordering many of the veins; veins dark brown to brownish yellow; stigmal spot not differentiated.

Female.—Length 18 to 25 mm. Differing from male principally as follows: general color somewhat paler; front brownish yellow, sometimes tinged with darker; in the better preserved specimens probably wholly thinly light pollinose just above antennae about one quarter the total width of the head when viewed from in front, the front at vertex only about half as wide as at antennae; front usually with an elongate median ridge tapering just above antennae to make room for four small ridges two on each side which extend from about the middle of the front just above the antennae outward towards the eyes, but the frontal ridges

vary much in prominence in different individuals, in some being almost obsolete; mesonotum and scutellum never blackish, usually yellowish brown to brownish yellow, hairs about the same as on the abdomen of the male, the three darker stripes of the mesonotum usually but faintly indicated and very narrow; pleura almost bare, with a few sparse short pale hairs only except for the metapleural tuft which is nearly as prominent as in the male; abdomen usually almost uniformly brownish yellow and legs concolorous with the abdomen.

Specimens examined: About 169 males and females.

QUEBEC: 3 ♂, 1 ♀, Mt. Royal, June 5, 1919, (Ouellet), [Ouellet]. 1 ♀, Fort Coulonge, July 7, 1917, (J. I. Beaulne), [C. N. M.]. 1 ♀, Hull, June 19, 1900, [C. N. M.].

ONTARIO: 1 ♀, Ottawa, [C. N. M.]. 1 ♀, Hamilton or Grimsby, June 1914, [Ont. Agr. College]. 1 ♂, 1 ♀, Belleville, [C. N. M.]. 1 ♀, Cumberland, June 6, 1900, [C. N. M.].

MANITOBA: 2 ♂, Manitoba, [C. N. M.].

MAINE: 1 ♂, Waterville, [B. S. N. H.]. 1 ♂, Wales, June 17, 1907, (C. A. Frost), [B. S. N. H.]. 1 ♀, probably from Maine, [Maine A. E. S. No. 1615, sub. 18].

NEW HAMPSHIRE: 1 ♂, Canobie Lake, June 20, 1892, (Geo. Dimmock), [B. S. N. H.].

VERMONT: 1 ♀, Manchester, June 9, 1910, [B. S. N. H.].

MASSACHUSETTS: 1 ♂, 1 ♀, Tynesboro, June 6 and 8, 1867 and 1 ♂, without date, [U. S. N. M.]. 3 ♂, Melrose Highlands, June 3 and 17, 1908, (D. H. Clemons) [U. S. N. M.]. 1 ♀, Auburndale, June 17, 1905, [B. S. N. H.]. 1 ♀, Waltham, June 17, 1897, (C. Bullard), [B. S. N. H.].

CONNECTICUT: 1 ♂, Branford, June 13, 1918; 1 ♀, North Branford, June 8, 1912, (all B. H. Walden), [all Conn. Agr. Exp. Sta.].

NEW YORK: 1 ♂, Olcott, June 5, 1912, (H. Dietrich), [C. U.]. Southfields, (J. Bequaert); 1 ♀, Protection, June 8, (M. C. Van Duzee), [Van Duzee]. 1 ♂, Ithaca, June 22, 1917, (S. H. Emerson), [C. U.]. 1 ♂, Pike, [N. Y. S. M.]. 1 ♂, Labrador Lake, Cortland Co. June 9, 1921, (M. D. Leonard), [C. U.]. Albany, May, [N. Y. S. M.]. 10 ♂, 9 ♀, West Point, June 3 and 4, 1911 and 1 ♂, June 13, 1911, (Wm. T. Davis), [Davis]; 4 ♂, 10 ♀, June 12 (Chas. Schaeffer and Wirt Robinson), [Brook. Mus.]. 1 ♀, Fort Montgomery, May 31, 1903, (Wm. T. Davis), [Davis]. 1 ♀, Ramapo, May 31 and 1 ♀, June 3, 1905, (Wm. T. Davis), [Davis]. 1 ♂, Suffern, [A. M. N. H.]. 1 ♀, Pearl River, May 31, 1913, (F. E. Watson), [A. M. N. H.]. 1 ♀, Long Pond and 1 ♀, Deep Pond, Wading River, L. I., June 26 and 27, 1917, (Wm. T. Davis), [Davis].

NEW JERSEY: 1 ♂, Hewitt, June 8, 1913, [A. M. N. H.]. 1 ♂, Greenwood Lake, June 6, 1909, (Wm. T. Davis), [Davis]. 1 ♂, May 30, 1911, (F. M. Schott), [Burns]. 1 ♀, Alpine, May 3, 1909, (Wm. T. Davis), [Davis].

PENNSYLVANIA: 9 ♂, 8 ♀, Inglenook, various dates from May 26 to June 27, 1911 to 1918, (H. B. Kirk, J. N. Knull, E. Daecke), [Pa. Dept. Agr.]; 1 ♀ June 2, 1914 and 1 ♀, June 14, 1913, (W. S. Fischer), [U. S. N. M.]; 2 ♂, 2 ♀, [A. N.

S. P.]. 1 ♀, Drumgold, June 11, 1919, (J. N. Knull), [Pa. Dept. Agr.]. 1 ♂, 2 ♀, Charter Oak, June 20, 1917, (H. B. Kirk), [Pa. Dept. Agr.]; 3 ♀, June 26, 1917, (A. B. Champlain), [U. S. N. M.]. 1 ♂, Enola, June 5, 1909, (H. B. Kirk and A. B. Champlain), 1 ♂, Rockville, May 27, 1919, (A. B. Champlain); 1 ♀, Lotell, June 13, 1915; 1 ♀, Weaver, June 17, 1917, (E. Daecke); 1 ♀, Winfield, June 19, 1909; 1 ♀, Hummelstown, June 10, 1917, (J. B. Knull), [all Pa. Dept. Agr.]. 1 ♂, Delaware Water Gap, June 4, (A. T. Slosson), [A. M. N. H.]. 1 ♀, Pittsburgh, and 1 ♀, (G. A. Ehrman), June 9, 1897, [U. S. N. M., ex Aldrich]. 1 ♂, Washington County, June 12, 1897, [U. S. N. M., ex Aldrich].

MARYLAND: 1 ♂, near Jackson's Island, May 30, [U. S. N. M.].

DISTRICT OF COLUMBIA: 1 ♂, Rock Creek, June 9, 1917, (C. H. T. Townsend), [U. S. N. M.].

VIRGINIA: 1 ♂, near Plummer's Island, May 23, 1914, (R. C. Shannon), [U. S. N. M.].

NORTH CAROLINA: 1 ♀, Retreat, May 31, [U. S. N. M.].*

FLORIDA: 1 ♀, doubtfully from Florida, (M. C. Van Duzee), [Van Duzee].

ILLINOIS: 1 ♂, Chicago, (C. T. Brues), [Brues]. 1 ♀, Fairbury, (?A. H. Gundt), [U. S. N. M.].

WISCONSIN: 1 ♂, 2 ♀, Polk County, (F. C. Baker), [Stanford Univ.]. 1 ♂, July, (F. C. Baker), [U. S. N. M., ex Aldrich]. 2 ♂, Balsam Lake, June 13, 1916, (Q. Lowry), [N. H. Agr. College]. 2 ♂ "Wisconsin" June 18, 1893, [W. G. Dietz].

MINNESOTA: 2 ♂, 2 ♀, from Minnesota, [U. S. N. M., ex Aldrich]. 5 ♂, 1 ♀, from Minnesota, May and June, (C. N. Ainslee); 2 ♂, Hennepin County, June 26; 1 ♂, Olmstead County, June 7, 1905 and 1 ♀; 1 ♂, 2 ♀, Ramsey County; 2 ♀, Lake Itasca, June 14 and 22, 1920, (S. A. Graham); 4 ♀, one on June 27, 1911; 1 ♂, St. Anthony Park, June 10, 1920, (H. H. Knight), [all U. of Minn.].

KANSAS: 1 ♀, Riley County, June 15, (Popenoe), [Kansas].

NEBRASKA: 1 ♀, Lincoln, June 21, 1917, (C. E. Mickel) and 1 ♀, June 13, 1915, (R. W. Dawson); 1 ♀, Omaha, June 4, 1913, (L. Bruner), 1 ♂, June 3, 1913, (J. T. Zimmer), and 1 ♂, June 11, 1913, (L. T. Williams); 1 ♀, Sprague, June 20, 1909, (C. H. Gable); 1 ♀, South Bend, June 14, 1913, (J. T. Zimmer); 1 ♂, Sioux County, (P. R. Jones), [all Nebraska].

RACHICERUS Haliday

1854. *Rachicerus* Haliday, in Walker's List. Dipt. Brit. Mus., v, Suppl., 1, p. 103.

1861. ?*Rhyphomorpha* Walker, Proc. Linn. Soc. London, v, p. 275.

1863. *Antidoxion* Snellen van Vollenhoven, Versl. en Meded. d. Kongl. Akad. van Wetensch. Afd. Naturk., v. p. 1.

1905. *Rhachicerus* Aldrich, Cat. N. Am. Dipt., p. 211.

Flagellum with twenty to thirty-five segments, serrate or often pectinate, especially in the males; eyes distinctly emarginate in

*Five specimens, reported from Canton, June 1910 and Linville Falls, early to late June, 1920, (F. Sherman), [No. Car.; data from Brimley].

both sexes just above the antennae; eyes separated by at least the width of the ocellar tubercle in both sexes, front about the same width in female as in male; a silvery patch of pubescence just above the antennae; tibial spurs 1 : 2 : 2; five posterior cells present; the fourth posterior cell and the discal cell closed.

GENOTYPE:—*Rachicerus fulvicollis* Haliday.

Key to Species of Rachicerus

1. Antennae distinctly pectinate below; reddish towards base. **obscuripennis** Lw.
Antennae not pectinate or if pectinations are present the processes no longer or but little longer below than above; not reddish towards base. 4
2. Mesonotum black or brownish black. 2
Mesonotum usually yellowish, never black or brownish black. 3
3. Mesonotum shining black; halteres yellow; wings hyaline with a dark cloud below stigma (Pa. Md. Mich.). **nitidus** Johns.
Mesonotum shining dark brown; halteres brownish; wings tinged with brownish (Cal.). **niger** n. sp.
4. Mesonotum brownish yellow with two broad brownish stripes; antennae with 22–23 segments, subpectinate below (Cal.). **honestus** O. S.
Mesonotum brownish yellow, without stripes (E. States and Can.). 5
5. Antennae serrate, with 21–22 segments. **fulvicollis** Hal. ♀
Antennae subpectinate below, with 28–35 segments. **fulvicollis** Hal. ♂

Rachicerus fulvicollis Haliday (Pl. III, fig. 18)

1854. *Rachicerus fulvicollis* Haliday, in Walker's List Dip. Brit. Mus. v, p. 104.
1877. *Rachicerus ruficollis* Osten Sacken, Bul. U. S. Geol. Sur. III, p. 212 [Evidently a mistake in name for *fulvicollis*.]
1905. *Rhachicerus fulvicollis* Aldrich, Cat. N. Am. Dip., p. 212.

Head and abdomen blackish; thorax yellowish brown; legs and halteres yellowish; wings slightly tinged with brownish, especially at apex; antennae serrate with twenty-one to twenty-two segments (female), subpectinate below with twenty-eight to thirty-five segments (male).

Male.—Length, 5 mm. Head: Front polished, black, narrow, only about the width of the ocellar tubercle and with sides parallel; palpi and proboscis small, pale yellow; antennae almost twice as long as thorax, shining black, the flagellum composed of about thirty segments, subpectinate, the processes being a little longer below than above.

Thorax: Mesonotum, scutellum, pleura, and metanotum brownish yellow, occasionally somewhat darkened on the metanotum which with the scutellum has

numerous fine pale hairs not readily seen except through the binocular; halteres pale yellowish, apparently somewhat darker at base of knob.

Abdomen: Blackish, shining above and below with numerous short somewhat appressed pale hairs.

Legs: Wholly pale yellowish including coxae, the extreme tip of tarsi very slightly darkened; the legs wholly covered with fine, pale, short somewhat appressed hairs.

Wings: Membrane very slightly tinged with grayish, stigmal area brownish; veins dark brown.

Female.—Length, 6 mm. Differs from male as follows: antennae with about eighteen segments in the flagellum, the segments deeply serrate; abdomen somewhat tinged with brownish, hairs very small and fine; wing membrane slightly darker than in male.

Specimens Examined: 11; 10 males, 1 female.

MASSACHUSETTS: 1 ♂, Beverley, (Ed. Burgess), [U. S. N. M.].

MARYLAND: 1 ♂, 1 ♀, near Plummer's Island, July 26, 1916, (H. S. Barber), [U. S. N. M., the female is the *allotype*].

VIRGINIA: 6 ♂, Glencarlyn, July 8, 1915, (C. T. Greene), [U. S. N. M.]. 1 ♂, (N. Banks), [A. N. S. P.].

GEORGIA: 1 ♂, "South Georgia," (H. K. Morrison), [U. S. N. M.].

***Rachicercus honestus* Osten Sacken**

1877. *Rachicercus honestus* Osten Sacken, Bul. U. S. Geol. Surv., III, p. 211.

1905. *Rhachicercus honestus* Aldrich. Cat. N. Am. Dipt., p. 212.

Antennae twenty-two to twenty-three segmented, black, subpectinate; thorax brownish yellow, with two broad brownish stripes; abdomen dark brown; legs yellowish; wings faintly tinged with brownish.

Male.—Length, 5.5 mm. Head: Vertex, front and face shining black, except the usual silvery patch above the antennae; palpi described as "yellow"—I would say brownish with tip yellow; proboscis brownish yellow; antennae black, first to third segments somewhat tinged with reddish especially inside and with twenty-one to twenty-two segments, subpectinate on the lower side (a little longer than above).

Thorax: Mesonotum brownish yellow with two broad sublateral brownish stripes which do not quite reach either the anterior or posterior margins; pleura brown above, brownish yellow below (not "brownish on underside"); halteres yellowish, slightly darker at base of knob. Scutellum brownish; metanotum on sides dark brown, in middle highly polished, inside the sutures dirty yellowish with a small dark brownish spot on median line.

Abdomen: Dark brown, instead of "with a delicate grayish-yellow pubescence," and I would say with short appressed yellowish hairs.

Legs: Wholly yellow, including coxae; tip of tarsi slightly darkened.

Wings: Uniformly lightly tinged with brownish; veins dark brown.

Female.—Allotype, California, [U. S. N. M.]. (Here described for the first time.) Length, about 8 mm. Similar to male except the antennal segments are not produced below more than above. Both antennae are broken one having only four segments, the other, eighteen.

Specimens Examined: 8; 6 males, 2 females.

CALIFORNIA: 1 ♂, 1 ♀, [U. S. N. M.; the ♀ is the *allotype*]. 3 ♂, 1 ♀, Blair's Rock, Redwood Creek, Humboldt County, June 9 and 10, (H. S. Barber), [U. S. N. M., 1 ♂; C. U., 1 ♂, 1 ♀]. 1 ♂, Lagunitas, Marin County, July 5, 1909, (E. C. Van Dyke), [A. N. S. P.]. 1 ♂, San Raphael, May 29, (Osten Sacken), [M. C. Z.; *type*].

Rachicerus niger new species

Wholly very dark brown, almost blackish; wings rather strongly tinged with brownish, veins dark brown; antennae twenty-segmented, slightly pectinate.

Male.—Length, 7 mm. Head: Vertex, front and face, including eye notches, shining black except a patch just above the antennae which is dull (in better preserved specimens this would probably be silvery pubescent); palpi black; proboscis more of a dark brownish; antennae blackish, about the length of the thorax, with twenty segments and slightly pectinate below.

Thorax: Mesonotum almost black, with fine short pale hairs, visible only in certain lights, shining, humeral calli and before scutellum tinged with brownish; pleura and metanotum shining black, metapleural hairs fine and pale; scutellum brownish on disc, with hairs as on mesonotum; halteres brownish.

Abdomen: Black, shining above and below with fairly abundant short appressed pale hairs.

Legs: Very dark brown, almost black, the front coxae behind rather distinctly and the femora and tibiae indefinitely towards the base tinged with brownish of a lighter shade; coxal hairs pale.

Wings: Veins dark brown; membrane rather strongly tinged with brownish, stigmal spot not present.

Female.—Unknown.

Holotype.—Male, collected by J. C. Bradley at Blue Lake, Humboldt County, California, June 20–27, 1907. Type deposited in the Cornell University collection, type no. 581.1. Unfortunately the right antenna has but thirteen segments remaining and the left, only one; the front and both middle legs except the coxae are missing, the left tibia, and the tarsi of both hind legs are also gone. Nevertheless this is undoubtedly a distinct species as no others discussed in this paper are so nearly wholly blackish. I feel sure that additional collecting will bring to light more specimens which would substantiate this as a valid species.

Rachicherus nitidus Johnson

1903. *Rhachicerus nitidus* Johnson, Ent. News, XIV, p. 22.

Shining black; antennae black with twenty-one to twenty-two segments not pectinate in female, slightly so in male; mouth-parts, halteres and legs yellowish, tip of tarsi darkened; wings hyaline, stigma brownish with a brownish tinge below.

Male.—Length, 6 mm. Head: Face, front and vertex, including eye notches shining black, except a patch of silvery pubescence just above base of antennae; palpi and proboscis yellowish; antennae black, 22-segmented, slightly pectinate and about the length of the thorax, the first two segments with black hairs.

Thorax: Mesonotum, scutellum and postnotum shining black, the first two with fine appressed yellowish hairs; humeri brownish yellow; pleura dull yellow; halteres pale yellow.

Abdomen: Shining black with fine appressed yellowish hairs.

Wings: Veins dark brown; membrane more or less slightly tinged with grayish, stigma dark brown with a slight brownish cloud below.

Female.—Length, 6 mm. Similar to male except that antennae are not pectinate and the brownish cloud below stigma is somewhat more prominent, extending to discal cell.

Specimens Examined: 12; 1 male, 11 females.

MAINE: 1 ♀, Bar Harbor, July 29, 1919, (C. W. Johnson), [B. S. N. H.].¹

NEW HAMPSHIRE: 2 ♀, White Mountains, (Osten Sacken), [M. C. Z.; one labelled "valleys," the other "woods"].

PENNSYLVANIA: 1 ♂, 1 ♀, Overbrook, near Philadelphia, June 2, (C. W. Johnson), [Johnson; *types*].

MARYLAND: 1 ♀, Plummer's Island, July 11, 1915, (R. C. Shannon), [Shannon].

VIRGINIA: 5 ♀, Great Falls, June 25-29, 1915, (C. T. Greene), [U. S. N. M., Div. Forest Ins.]. 1 ♀, opposite Plummer's Island, June 27, 1915, (R. C. Shannon), [U. S. N. M.].

Biology.—The type specimens were bred from larvae taken in a decayed log. Following the description of the adults is given a brief description of the larva and pupa.

The Pennsylvania specimens are the types and are in Mr. C. W. Johnson's collection. The Maryland specimen differs from the type in that the pleura are wholly shining black and I can count but twenty-one antennal segments.

Rachicerus obscuripennis Loew

1863. *Rachicerus obscuripennis* Loew, Berl. Ent. Zeitschr., VII, p. 4.

1905. *Rhachicerus obscuripennis* Aldrich, Cat. N. Am. Dipt., p. 212.

¹ Reported from the foot of Pickett Mountain by Johnson (1927: 178).

Antennae black, twenty-six to twenty-seven-segmented, strongly pectinate in the male, the processes often paler, somewhat pectinate in female, often reddish towards base of flagellum; front about one-third width of head; thorax brownish in male to almost blackish in female; abdomen blackish; legs mostly yellowish; wings tinged with grayish, more so in female; female more distinctly marked and darker than male.

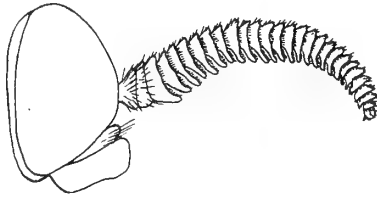


Fig. 1. *Rachicerus obscuripennis* Loew, head and antennae. ($\times 16$)

Male.—Length, 6.5 to 8 mm. Head: Vertex, front and face shining black, except the usual silvery pollinose band just above the antennae, the front broadened below so that at its widest point (about two-thirds the distance from the ocellar tubercle to the base of the antennae) it is about one-third the width of the head; palpi yellowish; proboscis black in type, yellowish to reddish in most other specimens I have seen and with short blackish hairs; antennae a little longer than thorax, strongly pectinate below with a long process from each segment (except two basal ones) which is curved at the apex and becomes shorter on the apical segments; twenty-seven-segmented but sometimes apical two or three segments are more or less fused into one; the segments blackish and the processes concolorous, except the basal ones more or less yellowish brown, or sometimes the basal four or five segments and their processes wholly yellowish brown; each segment with black hairs around the apex which are much longer on the two basal segments; the processes with fine pale hairs.

Thorax: Mesonotum subshining, and of a somewhat variable darker or lighter yellowish brown, sometimes with two or three more or less distinct darker stripes; with rather thick somewhat appressed pale hairs, hardly visible except in certain lights; pleura and scutellum yellowish brown, the latter with several darker spots; halteres pale yellowish.

Abdomen: Blackish, subshining, the first and last segments often more or less brownish; above and below with numerous fine appressed pale hairs.

Legs: Pale yellowish, the coxae sometimes tinged with brownish especially the posterior pair; the posterior femora brownish except base or basal half; posterior tibiae brownish at apex, sometimes broadly so; last three tarsal segments more or less brownish.

Wings: Membrane slightly tinged with grayish, broadly and more distinctly so on the apex; veins dark brownish.

Female.—Length, 8 to 12 mm. Differing from the male as follows: antennae pectinate but the processes only about one-half as long as in the male, the third segment wholly and the processes of about two to five of the basal segments of the flagellum reddish; palpi and proboscis usually brownish yellow; thorax darker, usually with two or three blackish stripes; pleura sometimes almost entirely blackish; abdomen, hairs shorter and almost black; legs, coxae wholly and femora except extreme tip blackish, the front femora usually however somewhat more brownish; otherwise legs much as in male but inclined on the whole to be somewhat darker; wings, darker than in male, tinged with grayish brown.

Type.—The Museum of Comparative Zoology has the following: One male labelled "Ill. Type Loew, obscuripennis m." in Loew's hand writing; one female labelled "Ill. Type Loew"; three females labelled "Osten Sacken," one of them from Illinois.

Specimens Examined: About 35 males and females.

MARYLAND: 1 ♂, Plummer's Island, June 29, 1913, (R. C. Shannon), [Shannon]; 1 ♂, June 29, 1913, (R. C. Shannon); 1 ♀, July 18, 1916, (R. C. Shannon); 1 ♀, July 11, 1909, (W. L. McAtee), [all U. S. N. M.]. 1 ♂, Cabin John, June 30, 1911, (Wm. T. Davis), [A. N. M. H.]; 1 ♂, June 25, 1917, (R. M. Fouts), [U. S. N. M.]. 1 ♂, Cabin John Run, June 17, 1910, (Wm. T. Davis), [Davis].

VIRGINIA: 2 ♀, Great Falls, June 20, (N. Banks), [Pa. Dept. Agr.]; 1 ♀, [A. N. S. P.]; 2 ♂, 1 ♀, June 21–29, (N. Banks), [Leonard, ex Banks]; 2 ♀, June 20 and 21, [A. M. N. H.]; 1 ♂, July 5, 1920, (Bridwell), [U. S. N. M.]; 4 ♂, 3 ♀, June 27, 1913 and June 29, 1915, (C. T. Greene), [U. S. N. M., Div. Forest Ins.]; 2 ♀, June 27, (N. Banks), [U. S. N. M., ex Aldrich]; 1 ♀, July 15, 1913, (Wm. T. Davis), [Davis]. 1 ♂, Chain Bridge, June 14, (N. Banks), [Daecke]. 1 ♀, Alexandria County, June 19, 1910, (Wm. T. Davis), [Davis]. 1 ♂, Falls Church, July 3, 1916, (J. N. Knull), [U. S. N. M. Div. Forest Ins.].

INDIANA: 1 ♀, Lafayette, July 14, 1915, (J. M. Aldrich), [U. S. N. M., ex Aldrich].

ILLINOIS: 1 ♂, 1 ♀ "Ill.," [M. C. Z.; *types*]. 1 ♀, "Ill.," (Osten Sacken), [M. C. Z.].

MICHIGAN:²

MISSOURI: 1 ♀, Atherton, June 20, 1901, [U. S. N. M., ex. Aldrich].

KANSAS: 1 ♂, Riley County, July 21, (Kimball), [Kansas].³

In addition to the above are two females in the Museum of Comparative Zoology, determined by Osten Sacken, but without locality label; also one female in the Kansas Agricultural College labelled only "No. 5."

Rachicerus sp.

In the United States National Museum is a single specimen

² Recorded from Detroit by Osten Sacken in Cat. N. Am. Dipt., Ed. 2, p. 42, (1878).

³ Also reported from Douglas County, by Snow (1903: 212).

which undoubtedly represents a new species. It was collected in Los Angeles County, California and is from the Coquillett Collection. Since the end of the abdomen is broken off I am unable to determine its sex but think it is probably a female. The halteres are also lacking. I hesitate to name the specimen but give the following brief description in case a perfect specimen should later turn up.

Length, (only five segments of abdomen present) 6 mm. Wholly shining, brownish, except mesonotum which is blackish and legs which are yellowish; antennae dark brownish, not pectinate and about fifteen or sixteen-segmented; wings pale brownish.

ARTHROPEAS Loew

1850. *Arthropeas* Loew, Stett. Ent. Zeitg., XI, p. 304.

1873. *Arthropaeas* Marsch., Nomen. Zool., p. 322.

Fairly robust flies in appearance; males holoptic, females with eyes separated by more than the width of the ocellar tubercle, front wider below; flagellum of antennae composed of seven segments, acute at tip; tibial spurs 1 : 2 : 2; five posterior cells, the fourth open, anal cell closed.

GENOTYPE: *Arthropeas sibirica* Loew.

Key to Species of *Arthropeas*

1. Wings distinctly banded; somewhat slender species; mesonotum grayish pollinose, with three broad darker stripes; sides of face bare; length 8 to 9 mm. (Wis. Minn. Pa. Mass.)..... **americana** Loew
 Wings not banded; somewhat more robust species; mesonotum almost or wholly blackish, sides of face hairy; length 12 to 14 mm. (Manitoba, S. Dak. and Cal.)..... 2
2. Mesonotum almost wholly black, in better preserved specimens with the lateral margins and two median stripes obscurely yellowish; abdomen more or less distinctly banded with black and yellowish; tibiae brownish yellow; face with median swelling very slight (Manitoba and S. Dak.)
magna Johns.
 Mesonotum, abdomen and legs wholly black; face with median swelling prominent (Cal.)..... **jonesi** Cresson

Arthropeas americana Loew

1861. *Arthropeas americana* Loew, Berl. Ent. Zeits., v, p. 316.

Front, face and thorax pale pollinose, the mesonotum with three broad dark stripes; legs, antennae and abdomen pale brownish yellow, abdomen concolorous, but tinged with reddish, the

segments broadly banded basally with black; wings grayish or pale brownish with a median band and an irregular area towards base whitish.

Female.—Length, 9 to 10 mm. Head: Front and face apparently black in ground color, but wholly yellowish pollinose and without hairs; the face about twice the width of the ocellar tubercle above, a little wider below; antennae pale brownish yellow, the flagellum tapering towards tip, the last segment several times as long as the others and ending in an acute point; palpi and proboscis also yellowish pollinose, the former with fine pale hairs, the latter showing brownish in places and with a few very fine pale hairs.

Thorax: Mesonotum and scutellum light grayish yellow pollinose, the former with three broad, dark brownish stripes, with rather numerous very fine, very short, pale hairs; pleura apparently pale brownish yellow more or less overlaid by light grayish yellow pollen, bare, except for the pro- and metapleura which have rather long pale hairs; metanotum mostly hidden on the specimens which I have seen but apparently concolorous with the pleura and bare; halteres pale brownish yellow.

Abdomen: Brownish yellow, sometimes tinged with brick red, first four segments with basal half dark brownish, in some cases this band, especially on the first and second segments may not reach the lateral border, thus tending to form merely a large median spot; sparsely covered above with fine short black hairs which are slightly longer on sides.

Legs: Coxae concolorous with pleura, hairs rather long, pale; rest of legs light brownish yellow, the tarsi but little darkened.

Wings: Membrane distinctly pale brownish or grayish brown somewhat variably marked with whitish as follows: a partial band through the middle comprising all or most of the discal cell and an equal area immediately above it; also usually a spot at the edge of the wing in each of the posterior cells, one at the base of the first basal cell and sometimes an elongate area partly in the first and partly in the second basal cells running nearly the length of each of them; costal cell tinged with yellowish brown; stigma elongate, dark brown; veins for most part dark brown but some of them yellowish whitish.

Male.—Unknown.

Holotype.—Female; "Northern Wisconsin," [M. C. Z.].

Specimens Examined: 8; 3 males, 5 females.

MASSACHUSETTS: 1 ♀, [M. C. Z.]. 1 ♂, Cheshire Harbor, near Mt. Greylock, June 30, (S. W. Beecroft), [B. S. N. H.].

CONNECTICUT: 1 ♀, "Conn.?", [Conn. Agr. Exp. Sta.].⁴

NEW YORK: 1 ♀, Brant Lake, [Brook. Mus.].

PENNSYLVANIA: 1 ♂, Lake Ganoga, North Mt., 2300 ft., August 29, 1897, [Johnson].

VIRGINIA: 1 ♀, Bald Knob, Bath County, July 19, 1916, (M. Hebard), [A. N. S. P.].

MICHIGAN: 1 ♂, Chatham, summer of 1902, [U. S. N. M., ex Aldrich].

WISCONSIN: 1 ♀, "Northern Wis.," [M. C. Z.; *type*].

⁴ Also recorded from New Haven, by Johnson (1925: 94).

Arthropeas jonesi Cresson

1919. *Arthropeas jonesi* Cresson, Proc. Acad. Nat. Sci. Phila., October, 1919, p. 176.

Male.—Length, 13 mm. Similar in general appearance to *A. magna* Johnson to which it is most nearly related. Black, antennae except tip; palpi, halteres and a small spot on the humeri, pale; almost wholly clothed with rather long black hairs; face with a pronounced median swelling similar to that in *Chrysopilus*; legs black; wings tinged with very dark gray, almost black along coastal border.

Female.—Unknown.

A single male, the type, from Keddie, Plumas Co., California, June 6, 1918, (F. M. Jones), [A. N. S. P., no. 6198].

Differs from the other two regional species in having the legs entirely black and in the prominence of the median swelling on the face. Cresson has suggested that the species may prove to be the type of a new genus or at least a subgenus. Because of lack of material, and especially since the female is unknown, it seems advisable to leave the species in its present position.

Arthropeas magna Johnson

1913. *Arthropeas magna* Johnson, Can. Ent., XL, p. 11.

Stout flies greatly resembling in the general appearance of both sexes *Coenomyia ferruginea* Scopoli. Blackish, the whole body and face more or less densely hairy; mesonotum dull yellow pollinose, almost obscured by three broad black stripes; abdomen shining black, segments 1 to 4 each with a broad apical yellowish band more or less interrupted on the median line; legs brownish yellow, femora darker; wings strongly tinged with brownish, especially along costal border and through the middle.

Male.—Length, 12 mm. Head: Face blackish overlaid by dull yellowish pollen, clothed on sides with moderately long, dense black hairs; palpi and proboscis brownish yellow, the former with a few black hairs mostly towards tip, the latter with some pale hairs at base; antennae brownish yellow, first two segments with a few black hairs, directed forward, longer and more numerous beneath; the flagellum apparently seven-segmented, acute at tip.

Thorax: Mesonotum black, with four dull yellow pollinose stripes, the lateral ones broader and touching the notopleural suture, the inner ones narrower, but expanding at each end, particularly caudad and connected with the lateral stripes; the black areas between the yellow stripes subshining caudad of the transverse suture; scutellum dull black, together with the mesonotum rather densely clothed with moderately long black hairs, which on the lateral margins become longer and

yellowish; pleura blackish, thinly clothed with long pale hairs, occasionally intermixed with a few black ones especially below, a dense tuft of yellowish hairs on metapleural swelling; halteres dirty yellowish; metanotum black, with pale hairs on sides, in the middle bare and shining.

Abdomen: Black, shining along median line and on lateral margins, the caudal margins of the first four segments each with a broad somewhat yellowish pollinose band which is more or less contracted on the median line and on the lateral borders, that, on the first segment usually being entirely interrupted on the median line; clothed with rather dense, moderately long, somewhat recumbent hairs which are black on the black parts and pale on the yellow bands; vertex almost wholly brownish yellow.

Legs: Coxae blackish, thinly brownish yellow pollinose, hairs black; remainder of legs brownish yellow, femora a little darker, especially on upper surface, tip of hind tibiae slightly darker, tarsi little if any darkened even at apex.

Wings: Strongly tinged with yellowish brown, an irregular darker area in middle from stigma through base of discal cell and also darkened along the free part of Cu; veins brownish; stigma diffuse, brownish, but little differentiated.

Female.—Length, 14 to 15 mm. Similar to the male with the following differences; front and occiput as well as face yellowish brown pollinose, hairs on sides of face shorter, less dense and erect, and pale yellowish; front, measured just above antennae about one-fourth total width of head, somewhat narrowed above so that at vertex it is hardly twice the width of the ocellar tubercle; front with five fine longitudinal more or less well defined grooves, the median one usually obsolete above, but sometimes broken up into three indistinct smaller grooves just below the ocelli; the lateral grooves often interrupted near the middle; mesonotal stripes usually more prominent and a brighter yellow than in the male; mesonotum and scutellum less hairy than in male; abdomen somewhat more shining but less hairy than in male, brownish black, the pollinose bands on first, second and third segments broadly interrupted along the median line.

Holotype.—Male; Beulah, Manitoba, [B. S. N. H.]. *Allotype*.—Female, topotypical, [B. S. N. H.]. *Paratype*.—1 ♂; topotypical, [M. C. Z.].

Specimens Examined: 12; 8 males, 4 females.

MANITOBA: 2 ♂, 1 ♀, Beulah, (type series). 1 ♂, 1 ♀, Aweme June 14, 1911, June 24, 1904, (N. Criddle), [A. N. S. P.]. 1 ♂, Aweme, June 20, 1914, [U. S. N. M., ex Aldrich]. 1 ♂, June 20, 1913, 1 ♀, June 25, 1913, Aweme, (N. Criddle); 1 ♀, Aweme, July 16, 1917, (N. Criddle); 1 ♂, Treesbank, June 24, 1923, (R. M. White), [all C. N. M.].

ALBERTA: 1 ♂, Calgary, [C. N. M.].

MONTANA: 1 ♂, Mystic Lake, 6700 ft., July 4, 1902, [A. L. Melander].

This species has been recorded from Hill City, South Dakota. by C. H. T. Townsend.

No female I have seen except the allotype has the scutellum "with three transverse ridges"; the paratype female in the Museum of Comparative Zoology could hardly be described as possessing them.

(**XYLOPHAGUS** Meigen) = *Crinna* Mg.

1800. *Erinna* Meigen, Nouvelle Classif., p. 21.

1803. *Xylophagus* Meigen, Illig. Mag., IV, p. 266.

1809. *Pachystomus* Latreille, Gen. Crust. et Ins., IV, p. 286.

Abdomen more or less elongate, especially in the males; both sexes dichoptic, the front of the males about twice the width of the ocellar triangle; the flagellum of the antennae eight-segmented, not tapering towards the tip, the last segment being more or less truncate at the apex; tibial spurs 1 : 2 : 2; fourth posterior cell open, anal cell closed.

GENOTYPE: *Nemotelus cinctus* Degeer.

Key to Species of *Xylophagus*

1. Antennae only about as long as transverse diameter of head when it is viewed in profile, first segment shorter than distance from its insertion to ocellar tubercle 4
 Antennae about twice as long as transverse diameter of head when it is viewed in profile, first segment at least as long as distance from insertion to ocellar tubercle 2
2. Legs entirely blackish; wings variegated with brownish and hyaline on outer half.
 longicornis Lw.
 Legs for the most part pale yellowish or reddish yellow; wings with apex brownish and usually with an irregular brownish band through base of discal cell which fades out before reaching anal border. 3
3. Hind tibiae dusky on upper surface or blackish on apex, often almost wholly dusky; length, 7 to 10 mm.; (confined for most part to E. U. S. and Can.)
 reflectens Walk.
 Hind tibiae reddish yellow (female) or dusky on upper surface (male); length 11 to 15 mm. (Confined for most part to Br. Col., Wash. and Ore.)
 decorus Will.
4. Abdomen with two or more segments distinctly reddish, the remainder blackish.
 fasciatus Walk. ♀
 Abdomen wholly blackish or dark brownish. 5
5. Legs almost wholly blackish. **lugens** Lw. ♀
 Legs for the most part yellowish, the darker parts brownish rather than blackish

6. Mesonotum wholly shining, without any pollinose stripes; (White Mts., N. H.).

nitidus Adams

Mesonotum with broad pollinose stripes. 7

7. Extreme lateral border of mesonotum pale pollinose, just inside of which is a more or less shining black stripe; abdomen almost always with a distinct brownish tinge; (Wash., Ore., Cal.) **gracilis** Will.

Lateral border of mesonotum wholly shining black; abdomen wholly black; (for most part confined to East. U. S. and Canada) 8

8. Front at point of insertion of antennae noticeably produced so that the antennae arise distinctly cephalad of the eyes; abdomen a little longer than the wings. **fasciatus** Walk. ♂

Front at point of insertion of antennae but little produced; abdomen a little shorter than the wings. **lugens** Lw. ♂

Xylophagus riangularis Say is omitted from the above key as it may not be a *Xylophagus* and it is furthermore unrecognizable at present.

Xylophagus decorus Williston

1885. *Xylophagus decorus* Williston, Can. Ent., xvii, p. 121.

1908. *Erinna decora* Kertész, Cat. Dip., III, p. 136.

Shining black; legs except tip of tarsi, reddish yellow, hind tibiae darkened in male; antennae longer than head; wings with a brownish cloud under stigma and apex clouded.

Male.—Moscow Mountain, Idaho, July 25, 1920, (R. C. Shannon), [Shannon collection]. (*Allotype*. Here described for the first time.) Length, 11–12 mm. Similar to female except as follows: front noticeably narrower; antennae wholly black; mesonotal stripes grayish rather than brownish; hind tibiae dark brownish on upper surface.

Female.—Length, 13 to 15 mm. Head: Front described as “but little shining, thinly brownish dusted.” In specimens before me the front is undoubtedly rubbed for it is shining black except on upper part and sides where it is grayish pollinose; vertex, including ocellar tubercle, and lower two-thirds to half of face shining black, upper part of face gray pollinose; antennae blackish, described as “tip of first joint and second more reddish brown”; the specimens before me have the reddish brown on inner side of second segment in but one case, the others wholly black; antennae longer than head (measured from above), the first segment at least half as long as the remaining ones taken together; the first two segments with fine black hairs, the remaining ones grayish or brownish pollinose in certain lights; palpi and proboscis blackish, the latter tinged with brownish, both with fine black hairs.

Thorax: Mesonotum broadly shining black on lateral and caudal borders, with two broad stripes of brownish pollen, narrowly separated on median line; pleura shining black; metanotum with short fine, pale hairs; halteres, with knob yellowish to reddish brown, the stalk somewhat darkened.

Abdomen: Blackish, shining, with short fine black hairs (which in the Mary's Peak, Ore., specimen appear in certain lights paler).

Legs: A dark reddish yellow, including coxae; last two segments of tarsi blackish.

Wings: Veins dark brown; membrane suffused faintly with pale brownish; a band arising beyond tip of scutellum, narrowing and evanescent just before anal border, a spot at apex of discal cell and the apex broadly, distinctly marked with brownish, but markings sometimes very faint.

Holotype.—Female; Washington Territory, (H. K. Morrison), [University of Kansas].

Specimens Examined: About 22 males and females.

SASKATCHEWAN: 1 ♀, Strathcona, Regina, May 20, 1905, (T. N. Willing), [U. S. N. M.].

BRITISH COLUMBIA: 1 ♂, 1 ♀, Kaslo, June 2, (H. G. Dyar), [U. S. N. M.]. 1 ♂, Vancouver, (R. H. Crystal), [Ent. Br., Dept. Agr. Canada]; 1 ♀, May 6, 1919, (R. S. Sherman); 1 ♂, May 23, 1918, (R. S. Sherman); 1 ♀, May 5, 1907, (R. S. Sherman); and 1 ♀, April 25, 1905 (R. S. Sherman), [all Sherman]. 1 ♀, June 6, 1903, [Sherman]. 1 ♀, Kokanee Mt., 9000 ft., Aug. 8, 1903, (R. P. Currie), [U. S. N. M.]. 1 ♀, Lillooet, May 17, 1916, [Hine]. 2 ♂, 1 ♀, Carbonate to Prairie Hills, July 12–18, 1908, (J. C. Bradley), [C. U.].⁵

WASHINGTON: 3 ♀, Hoquiam, April 30, 1904, May 12 and 14, 1904, (Burke), [U. S. N. M.]. 1 ♀, "Wash. Terr." (H. K. Morrison), [Kansas; *type*].

OREGON: 1 ♂, Coruallis, May 17, 1917, (Winter), [Cole]. 1 ♀, Mount Hood, [M. C. Z.]. 1 ♀, Mary's Peak, May 16, 1914, (L. G. Gentner), [Cole].

IDAHO: 1 ♀, Moscow Mountain, July 12, [A. L. Melander]; 1 ♂, July 25, 1920, (R. C. Shannon), [Shannon; *allotype*].

COLORADO: 1 ♀, Wolf-Fall Creeks, 7000 ft., June 20, (F. E. Lutz), [A. N. N. H.].

NEW HAMPSHIRE: 1 ♀, Franconia, (A. T. Slosson), [A. M. N. H.].

VIRGINIA: 1 ♀, Roslyn, April 23, 1913, (R. C. Shannon), [A. N. M. H.].

Two males from "Col" determined by Coquillett as *decorus* [U. S. N. M.] have the antennae short and the front somewhat produced; both as in the female of *lugens* Loew. They undoubtedly belong to this species, however.

***Xylophagus fasciatus* Walker**

1848. *Xylophagus fasciatus* Walker, List Dip. Brit. Mus., I, p. 128.

1854. *Subula fasciata* Walker, List Dip. Brit. Mus., Supp., I, p. 110.

1869. *Xylophagus abdominalis* Loew, Berl. Ent. Zeitschr., XII, p. 163.

1908. *Erinna abdominalis* Kertész, Cat. Dip., III, p. 134.

1908. *Erinna fasciata* Kertész, Cat. Dip., III, p. 136.

Blackish; abdomen in male wholly blackish, in female with from two to four segments reddish beginning with the second;

⁵ Recorded from Wellington, by Hine in Can. Ent., xxvii, p. 121, (1885).

legs reddish, tip of middle and hind femora and tibiae often darkened; wings with a brownish band through apex of basal cells.

Mr. C. W. Johnson has several males of this species in his collection which were bred with females from puparia of the same lot thus enabling me to identify several heretofore puzzling males as belonging to this species. The front at the point of insertion of the antennae is produced almost as much as in the female.

Male.—Length, 9 to 10 mm. Similar to female except that front is somewhat narrower, the abdomen is cylindrical and wholly black, the wing markings are somewhat paler and the legs are more yellowish than reddish. The abdomen has fine pale appressed hairs.

Female.—Length, 11 to 15 mm. Head: Front black, usually dull pollinose on caudal part especially just in front of ocellar tubercle, anterior part considerably produced so that antennae arise almost length of first segment cephalad of eyes, usually shining and often with two elongate swellings just in front of the transverse groove at the beginning of the frontal swelling; face black, shining, often dull on sides, a dull subquadrate spot on each side extending from insertion of antennae to eyes which is silvery below; palpi black, proboscis yellowish; head below eyes with pale rather dense hairs; antennae black, not longer than head (measured looking from above) first segment short, not much more than twice the length of the second, first two segments with fine black hairs.

Thorax: Mesonotum black, broadly shining on lateral borders, remainder pollinose in the better preserved specimens with two light gray stripes narrowly separated by darker on median line, usually more evident when viewed from behind, from which aspect may often be seen a darker stripe on each side of these and laterad of these again another gray stripe, often not as light as the median ones, which borders on the shining lateral stripe; pleura blackish, shining, sometimes paler along sutures, usually pale pollinose between middle and hind coxae and halteres; scutellum almost blackish, subshining; metanotum dull, with very fine abundant pale hairs; halteres with stalk brownish, knob yellowish.

Abdomen: Subshining, first segment blackish, segments two and three and often four and five reddish, remainder black, including lateral margins, the sutures narrowly and often the caudal border of the hindmost segment red; sternum usually colored similarly to tergum; fine black hairs above.

Legs: Coxae usually yellowish, front pair pale yellow and often with whitish pollen, hairs of all pale; remainder of legs reddish, apical two or three segments of tarsi infuscate and the hind tibiae and tip of hind femora occasionally more or less so.

Wings: Veins and stigmal spot dark brown; membrane more or less generally lightly suffused with grayish; a bar broadest at stigma, and tapering to inner end of Cu, together with discal cell, brownish, the apex of wing more or less clouded with brown, some of the other veins sometimes more or less clouded with brown; markings vary somewhat in intensity and extent.

Type.—Female; St. Martin's Falls, [British Museum Collection].

Specimens Examined: About 42 males and females.

HUDSON BAY: 1 ♀, St. Martin's Falls, [British Mus.; *type*].

QUEBEC: 1 ♀, Saguenay River, July 26, 1906, [Pa. Dept. Agr.]. 1 ♀, Fort Coulonge, July 8, 1917, (J. I. Beaulne), [C. N. M.].⁶

ONTARIO: 1 ♀, Ottawa, [U. S. N. M.; as *fasciatus* Walk.].

MANITOBA: 1 ♀, Piquitenay, near Winnipeg, July 23, 1917, (A. M. N. H.).

ALBERTA: 1 ♀, Banff, May 5, 1922, (C. B. D. Garrett), [C. N. M.].

BRITISH COLUMBIA: 1 ♀, "B. C.," [A. N. M. H., ex W. M. Wheeler; as *lugens* Lw.]. 1 ♀, North Westminister, May 12, 1909, [Pa. Dept. Agr.]. 1 ♂, Luggar, [U. S. N. M.].

MAINE: 1 ♀, Greenville, July 21, 1929, (F. Haimbach), [A. N. S. P., ex Haimbach].

NEW HAMPSHIRE: 1 ♀, White Mountains, (Osten Sacken), [M. C. Z.]. 1 ♀, Mt. Washington, (A. T. Slosson), [U. S. N. M.]. 1 ♀, Webster, (W. F. Fiske), [U. S. N. M.].

MASSACHUSETTS: 2 ♂, 3 ♀, Riverside; 1 ♀, South Sudbury; 1 ♀, Machias, [all B. S. N. H.].

NEW YORK: 1 ♀, Albany, May 15, (D. B. Young), [N. Y. S. M.].

NEW JERSEY: 1 ♀, Grenlock, May 6, 1906, (H. Wenzel), [Pa. Dept. Agr.].

PENNSYLVANIA: 1 ♀, Linglestown, May 17, 1919, (Kirk & Champlain); 2 ♀, Conewago, (bred from larvae under pine bark, adult emerged May 1912); 2 ♀, Endeavor, July 30, 1917, (J. N. Knull); 1 ♀, Inglenook, April 30, 1917; 1 ♀, Hunter's Run, August 20, 1920, (J. W. Knull); 1 ♀, Mt. Holley, June 22, 1919, (A. B. Champlain), [all Pa. Dept. Agr.]. 1 ♂, Rockville, adult reared Aug. 26, 1913, (A. B. Champlain), [U. S. N. M.; Hopkins U. S. 10477]. 1 ♂, State College, May 25, 1902, (Craighead), [U. S. N. M.].

VIRGINIA: 1 ♀, Great Falls, April 20, 1913, (R. C. Shannon); 1 ♀, Shipman, May 13, 1913, (T. E. Snyder), (Div. Forest Ins. Coll. Hopkins U. S. 3731, f. reared); 1 ♀, Falls Church, (J. N. Knull), [all U. S. N. M.].

GEORGIA: 1 ♀, "S. Ga.," (Morrison), [U. S. N. M.].

TEXAS: 1 ♀, "Texas," [M. C. Z.; *type* of *abdominalis* Lw.].

COLORADO: 4 ♀, "Colorado," [U. S. N. M.].

WYOMING: Big Hun Mts., (R. P. Currie), [U. S. N. M.].

IDAHO: 1 ♂, Troy, May 7, 1909, [Melandar].

OREGON: 1 ♀, Grant County, July 7, 1914, (W. J. Chamberlain), [Ore. Agr. College].

Notes on Types.—I was unable to locate in the British Museum Walker's type of *fasciatus*. *X. abdominalis* Lw. was described from a single female. The type is in the Museum of Comparative Zoology. All but the first two segments of the antennae are

⁶ Also reported from Montreal, by Chagnon in Suppl. 7th Rept. Que. Soc. Proct. Pl., p. 124, (1915).

lacking and the legs for the most part are gone. The specimen is labelled "Type. Loew, Tex." in Loew's handwriting. In addition to this is a female labelled by Osten Sacken "White Mts. *fasciatus* Walk." The abdomen is wholly red except the last two segments. The front is shining only just above the antennae.

•I consider that Walker's *fasciatus* is merely Loew's *abdominalis* in which the abdomen is almost wholly red and in which the tibiae and tarsi are darker, both characters which could easily vary, but since Walker's name is older it must take priority. Given a larger series of specimens than now exists in collections, I believe they could not be separated.

A female, Saguenay River, Quebec, July 25, 1906 from the Daecke collection has the abdomen wholly blackish but undoubtedly belongs to this species.

***Xylophagus gracilis* Williston**

1885. *Xylophagus gracilis* Williston. Can. Ent., VII, p. 121.

1908. *Erinna gracilis* Kertész. Cat. Dip., III, p. 136.

Blackish, mostly shining; antennae only about as long as head, length of first segment less than distance from insertion to ocellar tubercle; legs yellowish, femora towards apex and hind tibiae at tip slightly brownish, tip of tarsi dark brownish; wings hyaline variegated on apical half with brownish, stigma elongate and blackish.

Male.—Length, 8 mm. I have seen but three specimens of this sex. The one from Eureka, Cal. is about 8 mm. long and similar to the female. One from Vashon, Wash., has the abdomen entirely black, but is undoubtedly referable to this species.

Female.—Length 9 to 10 mm. Head: black; front light gray pollinose, the ocellar tubercle shining; face at least on upper half grayish pollinose; palpi black; proboscis yellowish; antennae only slightly longer than the head, first segment shorter than distance from insertion to ocellar tubercle, second only about one-third length of first, third but slightly longer than second, first two segments blackish; somewhat light gray pollinose, remainder more brownish, the basal segments of flagellum and of the third segment on the inside usually paler.

Thorax: Mesonotum shining brownish, but this however is mostly obscured by two very broad median stripes, narrowly interrupted and by the lateral margins which are grayish pollinose, with very fine short rather numerous pale hairs; scutellum dark brownish usually somewhat paler along the margin and sometimes somewhat grayish pollinose; humeri and postalar collosities obscurely yellowish; pleura shining dark brownish somewhat paler at the sutures; metanotum brownish, blackish in middle; halteres pale yellowish.

Abdomen: Shining blackish, of a distinctly reddish brown cast above on the first two or three segments; the dorsum with abundant short fine pale hairs; ovipositor yellowish brown.

Legs: Coxae pale yellowish, the hind pair with a blackish spot at the base on the outside; remainder of legs yellowish, the femora except base, light reddish, more distinct towards apex, especially on hind pair; tibiae yellowish, middle and hind pair, except extreme base, reddish brown more distinct at apex of hind pair; tarsi pale yellowish, apical two or three segments blackish.

Wings: Veins dark brownish, membrane hyaline, the outer half variegated with brownish and hyaline almost exactly as in *X. lugens* Loew—a broad irregular band through the base of the discal cell from the stigma to the anal border, the apex of the wing broadly irregularly brownish, most of the apical cells with a hyaline spot.

Specimens Examined: 9; 4 males, 5 females.

BRITISH COLUMBIA: 1 ♂, Vancouver, May 12, 1916, (R. S. Sherman), [R. S. Sherman].⁷

WASHINGTON: 1 ♀, Keyport, July 1905, (R. W. Doane), [Cole]. 1 ♂, Vashon, May 28, 1917, (A. L. Melander), [Melander]. 1 ♂, Troy, May 7, 1909, [Melander]. 1 ♀, Washington? (L. H. Churchill), [Cole].⁸

OKEGON:⁸

CALIFORNIA: 1 ♀, Redwood Canyon, Marin County, May 17, 1908, [A. N. S.P.]. 1 ♂, Eureka, July 6, (H. S. Barber), [U. S. N. M.].

COLORADO: 1 ♀, Burke, May 9, 1904, (Wm. Hoquian).

In addition to the above, 1 ♀ labelled "N. West" May 23, 1908, (R. S. Sherman), [Sherman].

This species resembles *X. lugens* Lw. in the wing markings and those of the legs except that the latter are much paler. The antennae are a little longer but not nearly so long as in such species as *reflectens* Walk. and *longicornis* Lw.

The specimen from Redwood Canyon, Cal. has a broad shining band on the front which is undoubtedly due to rubbing.

***Xylophagus longicornis* Loew**

1869. *Xylophagus longicornis* Loew, Berl. Ent. Zeitschr., XIII, p. 163.

1908. *Erinna longicornis* Kertész, Cat. Dip., III, p. 136.

Wholly black, mostly shining knob of halteres pale yellow, wings marked with brownish on apical half; antennae long, about twice the cephalo-caudal axis of the head.

Male.—Unknown.

⁷ Also reported from Port Renfrew, by Hine (1904: 89) as *rufipes*.

⁸ Reported from "Washington Territory," and from Mount Hood, Oregon by Williston (1885: 121).

Female.—Length, 10 to 11 mm. (measured to base of ovipositor). Head: Black, face, front and vertex (including ocellar tubercle) shining except a band covering upper third of face and usually a narrow band through lower half of and extending slightly below ocellar tubercle which are dull grayish pollinose; palpi dull black, proboscis dull brownish black, the latter with fine, sparse black hairs; antennae dull black, the first two segments with fine black hairs, the third in certain lights a grayish pollinose; antennae about twice as long as depth of head viewed from dorsal aspect, the first segment elongate, at least half as long as remaining segments together.

Thorax: Black, shining on lateral and caudal margins, with two broad stripes of grayish or brownish pollen; scutellum shining black; pleura shining black, with fine short black hairs in front of halteres; halteres pale yellowish, with brownish.

Abdomen: Black, subshining, above and on sides with fine black appressed hairs each rising from a minute puncture.

Legs: Wholly black, knees and tibial spurs somewhat paler.

Wings: Veins dark brownish; membrane somewhat variously clouded with brownish, chiefly on apical half, most every cell with a hyaline spot of varying size, basal cells often with only the veins bordered slightly with brownish.

Type.—This is a female labelled "Type. Loew. Mass.," [Museum of Comparative Zoology]. It is about 10 mm. long.

Specimens Examined: 15 females.

MASSACHUSETTS: 1 ♀, "Mass." [M. C. Z.; *type*].

PENNSYLVANIA: 2 ♀, Roxboro, May 9, 1909, (C. T. Greene), [Pa. Dept. Agr.]; 2 ♀, May 9, 1909, [A. N. S. P.]. 1 ♀, Inglenook, May 19, 1912, [Pa. Dept. Agr.].

MARYLAND: 1 ♀, Plummer's Island, May 7, 1916, (R. C. Shannon); 2 ♀, May 9, 1915, (J. C. Crawford), [U. S. N. M.].

VIRGINIA: 1 ♀, Great Falls, May 25, (N. Banks), [Banks]; 2 ♀, May 11, 1917, (C. T. Greene), [U. S. N. M.]. 1 ♀, Dead Run, Fairfax County, May 9, 1916, (R. C. Shannon), [U. S. N. M.].

OHIO: 1 ♀, Cincinnati, May 18, [Hine].

MICHIGAN: 1 ♀, Detroit, (H. G. Hubbard), [U. S. N. M.].

This interesting species, not until now recognized since it was originally discovered in 1869 has the antennae of *reflectens* Walker and the wings of *lugens* Lw. It is very characteristic.

Xylophagus lugens Loew (Pl. I, fig. 4, Pl. II, fig. 10)

1863. *Xylophagus lugens* Loew, Berl. Ent. Zeitschr., VII, p. 5.

1908. *Erinna lugens* Kertész, Cat. Dip., III, p. 136.

Black; antennae about as long as head; legs variable black and yellowish. Female with more black than the male; wings in female with apex, costal border and a broad band just beyond middle brownish, as well as most veins bordered with brown, in male usually much paler.

Male.—Length, 7 to 9 mm. Head: Vertex, front and face mostly light gray or whitish pollinose, the ocellar tubercle, a narrow patch just above the antennae, and a V-shaped patch on the face pointed above and extending nearly to the antennae, shining black; the elongate pollinose patches below antennae on raised calli; antennae black, only about as long as head (measured from dorsal aspect), front but little protruding so that antennae arise almost on the level of the eyes, first segment short, only about twice length of second segment, first segment with fine pale hairs; palpi black; proboscis dirty yellowish.

Thorax: Mesonotum black, broadly subshining on sides, in better preserved specimens whole disc gray pollinose and when viewed from side or front usually with three light gray pollinose stripes, the middle one on median line narrow, all three merging behind transverse sutures; with fine pale hairs dense on disc, sparse on shining lateral borders; pleura shining black; scutellum dull black, gray pollinose except along edge, with abundant fine pale hairs; metanotum dull black, with abundant fine pale hairs; halteres dirty whitish or yellowish, stalk sometimes somewhat brownish.

Abdomen: Black, subshining, above and below with rather dense recumbent fine pale hairs.

Legs: Coxae pale yellowish, hind pair usually and middle pair sometimes broadly shining black at base, coxal hairs pale; femora yellowish, apical third of first two pairs often, and of hind pair usually, dark brownish; tibiae yellowish, hind pair brownish on apex to wholly dark brownish except base, the first two pairs often more or less broadly dark brownish from apex basad; tarsi blackish, base to nearly the tip of metatarsi yellowish.

Wings: Veins dark brown; membrane faintly suffused with grayish, a band from the stigma (which is rather faintly marked) to tip of cell M, the apex of wing, and the apex of discal cell marked with rather pale brownish.

Female.—Length, 9 to 12 mm. Similar to male with following exceptions:—Head: front somewhat wider and produced so that antennae arise cephalad of eyes a distance almost equal to length of first antennal segment; pollinose patch below each antenna not extending so far downward and because face is wider, proportionately more of it is shining; hairs of first antennal segment and of abdomen black; legs with more blackish than male, middle and hind coxae often almost wholly blackish and front pair sometimes broadly so at base, femora usually wholly blackish, tibiae whitish yellow or yellowish broadly to only faintly at base, tarsi as in male or only narrowly paler at base of metatarsus; wings with markings usually dark brownish, often most of the veins bordered, sometimes broadly so with brownish.

Notes on Types.—In the type series is a female "Loew, N. H.," two females "Loew, Penns. Auxer"; also three females, Osten Sacken, from "Brookline, Mass.," "N. H." and "Pa." They all agree well with Loew's description. I failed to find a specimen from Illinois which Loew gives as the type locality. This has

probably either been lost or he mistook the label "N. H." for "N. Ill."

Specimens Examined: About 89 males and females.

NEW HAMPSHIRE: 1 ♀, "New Hampshire," *type* and 1 ♀, (Osten Sacken), [M. C. Z.]; 2 ♀, Franconia, (A. T. Slosson), [A. M. N. H.]; 2 ♀, (A. T. Slosson), [U. S. N. M.]; 1 ♀, Mount Washington, July 7, 1910, [B. S. N. H.]; 1 ♀, Glen House, June 12, 1916, [B. S. N. H.].

MASSACHUSETTS: 1 ♀, Framingham, May 18, 1912, 1 ♀, April 9, 1906, (C. A. Frost); 2 ♂, April 2, 1907, [B. S. N. H.]; 1 ♀, Stoneham, April 1, (F. A. Sheriff), [B. S. N. H.]; 1 ♀, Brookline, (Osten Sacken), [M. C. Z.].

CONNECTICUT: 1 ♂, Lyme, April 3, 1910, 1 ♀, May 14, 1911, (A. B. Champlain), [Conn. Agr. Exp. Sta.]; 1 ♀, Storrs, 1925, (R. S. Filmer), [Conn. Agr. Exp. Sta.].

NEW YORK: 1 ♂, Niagara Falls, May 16, 1909, (M. C. Van Duzee), [Leonard]. Syracuse (M. W. Blackman), [Hine]. 1 ♀, Ithaca, April 28, 1897 and 1 ♂, [C. U.]; 1 ♀, May 20, 1893, [N. Y. S. M.]; 1 ♀, May 14, 1916, (R. C. Smith), [Kansas]. 1 ♀, McLean, May 14, 1916, [Leonard]. 1, Slide Mountain June 3, (M. D. Leonard), [C. U.]; 1, Albany, May 2, (E. P. Felt; reared from under dead bark), [N. Y. S. M.]; 1, Nassau, April 19, reared from under pine log, (E. P. Felt), [N. Y. S. M.]; 1 ♀, Mosholu, May 4, (Wm. T. Davis), [Davis]. 2 ♀, Staten Island, April 17, (Wm. T. Davis), [Davis]. 1 ♀, Queens, L. I., May 10, 1910, (C. E. Olsen), [Brook. Mus.]; 1 ♂, 1 ♀, Richmond Hill, L. I., April 28, 1908, (E. Daecke), [Pa. Dept. Agr.]; 1 ♀, Flatbush, L. I., [Brooklyn Mus.]; Cypress Hills, L. I., (Chas. J. Martin) [Brook. Mus.].

NEW JERSEY: 1 ♂, Clementon, April 22, 1901, (E. Daecke), [Pa. Dept. Agr.]; 1 ♀, Gloucester County, May 7, 1904, (F. Haimbach), [A. N. S. P., ex Haimbach]. 1 ♀, Rahway, April 18, (J. A. Grossbeck; bred), [A. N. M. H.]; 1 ♀, Paterson, May 3, [Brook. Mus.]; 1 ♀, Greenwood Lake, May 1, 1918, (Wm. T. Davis), [Davis]. 1 ♀ Great Notch, May 10, 1914, (Wm. T. Davis), [Davis]. 1 ♀, Castle Rock, (A. B. Chamberlain; bred Mar. 21), [W. R. Walton]. 1, Alpine, April 19, 1908, (G. P. Englehardt; bred from under bark of dead chestnut), [Pa. Dept. Agr.].

PENNSYLVANIA: 2 ♀, "Penna.," (Auxer), [M. C. Z.]; 1 ♂, 1 ♀, Castle Rock, Apr. 20, 1902, in coitu; 1 ♀, April 30, 1917; 1 ♂, April 18, 1909, (E. Daecke); 1 ♀, Linglestown, April 10, 1910; 1 ♀, April 27, 1909, (W. R. Walton); 1 ♂, Perdix, April 30, 1911; 3 ♂, 1 ♀, Wetzel's Swamp, Harrisburg; bred, adults emerging Mar. 29, 1909, (A. B. Champlain); 1 ♀, Heckton Mills, Apr. 6, 1918, (J. L. King); 1 ♀, Rockville, April 4, 1920 (A. B. Champlain), [all Pa. Dept. Agr.]; 1 ♂, 1 ♀, Somerton, March 20, (L. R. Unruh), [A. N. S. P.]; 1 ♂, Hazelton, May 5, 1916, [A. N. S. P., ex Dietz]. 1 ♂, Washington County, (Ehrmann), [U. S. N. M., ex J. M. Aldrich]. 1 ♀, North Cumberland, (A. B. Champlain), [W. R. Walton]. 2 ♀, West Chester, bred Mar. 3, 1909, with pupal skins, [W. R. Walton]. 1 ♂, Germantown, April 21, 1905, [A. N. S. P.]; 1 ♀, Glenside, March 28, [A. N. S. P.].

MARYLAND: 2 ♀, Apr. 19, 1914; 1 ♂, April 12, 1915, (R. C. Shannon), [U. S. N. M.].

VIRGINIA: 1 ♂, 1 ♀, Dead Run, Fairfax County, April 13, 1916; 8 ♂, 2 ♀, April 8, 1916; 1 ♂, April 21, 1916, (R. C. Shannon), [Shannon]. 1 ♀, Falls Church, April 12, 1916, (R. A. Cushman), [U. S. N. M.; Div. Forest Ins., Hopkins U. S. Nos. 10270, 10280g, 10252, 10288, 2997]; 1 ♂, April 27, 1914, (C. T. Greene), [U. S. N. M.].

NORTH CAROLINA: 1 ?, Blantyre, April 15, 1906, (R. W. Collette), [N. Car. Dept. Agr.].

INDIANA: 1 ♀, Bluffton, April 25, 1902, (Chas. C. Dean), [Hine].

MICHIGAN: 1 ♂, Detroit, (H. G. Hubbard), [U. S. N. M.].

MINNESOTA: 1 ♂, Ramsey County, [U. S. N. M., ex Aldrich].

***Xylophagus nitidus* Adams**

1904. *Xylophagus nitidus* Adams, Kans. Univ. Quart., IV, p. 435.

1908. *Erinna nitida* Kertész, Cat. Dip., III, p. 136.

Shining dark brownish, including thorax; antennae a little shorter than head; a narrow yellow line from humeri to base of wings; legs yellow, femora except base brownish, fore and middle tibiae and tarsi brownish yellow, hind ones darker brown, the terminal two or three segments of all the tarsi blackish; wings slightly tinged with brownish, a little darker at base of discal cell, stigma dark brown.

Male.—Unknown.

Female.—Length, 9 to 10 mm. Head: Blackish, front and face gray pollinose, ocellar tubercle somewhat shining; antennae only about three quarters length of head, first segment only about twice length of second, third subequal to second, flagellum subequal to first three segments, first two segments slightly darker than remainder which are brownish and with fine blackish hairs; the front not noticeably produced so that the antennae arise cephalad of the eyes; palpi dark brownish and clothed with fine dark hairs; proboscis pale yellowish.

Thorax: Mesonotum and scutellum shining dark brownish, with fairly abundant short pale hairs, the humeri and a pale narrow line enclosing the spiracle in front, pale yellowish; pleura shining dark brownish; metanotum also shining dark brownish with fine pale hairs on sides; halteres pale yellowish.

Abdomen: Shining dark brownish, very narrowly yellowish at the sutures, with numerous somewhat appressed fine pale hairs.

Legs: Coxae pale yellowish except the hind pair brownish at base on the outside; femora, except at base, brownish, more distinct on the hind pair; tibiae yellowish, the fore and middle pairs somewhat tinged with brownish, the hind pair distinctly so, but paler at extreme base and tip; tarsi with apical two or three segments blackish, otherwise yellowish, except the hind pair which are distinctly brownish.

Wings: Veins dark brown; membrane almost uniformly tinged with pale brownish, a little darker on apex and through the base of the discal cell; stigma dark brownish, elongate.

Specimens Examined: 11, all females.

NEW HAMPSHIRE: 3 ♀, Mount Washington, (A. T. Slosson), [A. M. N. H., ex Slosson]. 2 ♀, (A. T. Slosson), [U. S. N. M.]. 1 ♀, (A. T. Slosson), [B. S. N. H.]. 5 ♀, (Geo. Dimmock), [U. S. N. M.].

One of Mrs. Slosson's females has the front legs somewhat paler than the other two specimens. The tip of the second antennal segment is hardly noticeably paler in her specimens. I have not seen the type but these specimens are beyond doubt referable to Adams' *nitidus*. This species apparently differs from the other regional members of the genus particularly in that the mesonotum is wholly shining and without pollinose stripes.

Specimens in the United States National Museum have the abdomen above, except the base and tip, distinctly dark reddish as if they were somewhat teneral.

***Xylophagus reflectens* Walker**

- 1841. *Xylophagus reflectens* Walker, List. Dipt. Brit. Mus., I, p. 129.
- 1850. *Xylophagus persequus* Walker, Ins. Saund., I, p. 1.
- 1854. *Subula reflectens* Walker, List. Dipt. Brit. Mus., v. Suppl. I, p. 110.
- 1869. *Xylophagus rufipes* Loew, Berl. Ent. Zeitschr., XIII, p. 163.
- 1908. *Erinna persequa* Kertész, Cat. Dipt., III, p. 136.
- 1908. *Erinna reflectens* Kertész, Cat. Dipt., III, p. 137.
- 1908. *Erinna rufipes* Kertész, Cat. Dipt., III, p. 137.

Shining black; antennae longer than head; legs yellowish to reddish, tip of hind tibiae more or less broadly, and tip of all tarsi blackish; wings with brownish cloud under stigma, at apex of discal cell and on apex of wing.

Male.—Length, 7 to 10 mm. Head: Front and vertex, including ocellar tubercle, shining black, the former gray pollinose just below the tubercle; face with upper half light gray to silvery pollinose, lower half shining black; palpi black, proboscis brownish to yellowish; antennae blackish, distinctly longer than head (measured from above), first segment not less than one-half as long as remainder of antennae taken together and distinctly longer than distance from insertion to ocellar tubercle.

Thorax: Black; mesonotum shining along lateral margins, the remainder only subshining with two light gray pollinose stripes in center which nearly reach the caudal border; pleura shining black, bare; scutellum and metanotum shining black; the mesonotum and scutellum with very fine short pale hairs, on the mesonotum somewhat longer especially laterad; halteres pale yellow.

Abdomen: Shining black, above and below with fine, appressed, fairly abundant, moderately long, pale hairs.

Legs: Pale yellowish to reddish, including coxae; the hind tibiae somewhat variable, usually only the apex narrowly blackish but this is extended often so

that the whole tibia is more or less tinged with dusky especially on the upper or caudal surface; rarely the tip of the hind femora is slightly darkened, particularly above; fore and middle tarsi with last two segments blackened, the hind pair usually with the apex of the metatarsus and the remainder except the base of the second segment blackened.

Wings: Veins dark brown, membrane clear, more or less distinctly marked with brown as follows: a slight narrow cloud from stigma through base of discal cell, the apex of the discal and the apex of the wing rather broadly; in pale specimens these markings may be hardly visible; stigma narrow, elongate, dark brown.

Female.—Length, about 10 mm. Similar to male except that face becomes narrower ventrad.

Specimens Examined: About 103 males and females.

"CANADA:" 1 ♂, 1 ♀, (Osten Sacken), [M. C. Z.].

QUEBEC: 1 ♂, Montreal, June 21, 1906, (G. Beaulieu), [C. N. M.]. 2 ♀, Mount Royal, May 23; 1 ♀, July, (Ouellett), [Ouellett]. 1, St. Hilaire, May 24, 1919, (Ouellett), [Ouellett].

ONTARIO: 1 ♀, Guelph, July 22, 1912, [Ont. Agr. Coll.].

NEW BRUNSWICK: 1 ♂, Fredricton, June 22, 1914, (F. M. McKenzie), [New Brunswick Dept. Agr.].

BRITISH COLUMBIA: 1 ♂, Skagit Valley, July 20, 1909, [Pa. Dept. Agr., ex Daecke].

MAINE:⁹

NEW HAMPSHIRE: 1 ♀, Bretton Woods, June 25, 1913, (C. W. Johnson), [B. S. N. H.]. 2 ♂, Glen House, June 12, 1916; 1 ♂, June 14, 1916, (C. W. Johnson), [M. D. Leonard]; 4 ♂, 2 ♀, June 11–18, 1916, (C. W. Johnson), [B. S. N. H.]; 1 ♂, 1 ♀, June 11, 14, 1916, (C. W. Johnson), [A. N. S. P.]. 1 ♀, "Gorh.," (Osten Sacken), [M. C. Z.]. 3 ♀, Franconia, (A. T. Slosson), [U. S. N. M.]. 1 ♀, Pike (E. J. Knaus), [U. S. N. M.]. 1, Mount Washington, (A. T. Slosson), [A. N. M. H.]; 3 ♂, 2500 ft., June 14–23; 5 ♂, June and July, (C. W. Johnson), [B. S. N. H.].

VERMONT: 1 ♂, 1 ♀, Manchester, June 5 and 9, 1910, (C. W. Johnson), [B. S. N. H.].

MASSACHUSETTS: 1 ♀, "Mass." type, [M. C. Z.; type of *rufipes* Lw.]. 1 ♀, Chester, May 26, 1912, (C. W. Johnson), [B. S. N. H.]. 1 ♀ Mount Greylock, June 15, 1906, (C. W. Johnson), [B. S. N. H.].

NEW YORK: 1 ♀, Mt. Seward, June 22, 1901, 4500 ft., (MacGillivray and Houghton), [C. U.]. 2 ♂, Lake Tear, July 29, 1920, 4300–4600 ft., (J. Bequaert), [A. M. N. H.]. 1 ♀, West Danby, May 31, 1890, [C. U.]. 1 ♂, West Winfield, June 7, 1921, (M. D. Leonard), [Leonard]. 1 ♀, Slide Mountain, June 3, (M. D. Leonard), [Leonard]. 1 ♂, May 31, 1906, 1 ♂, 1 ♀, June 28, 1907, 1 ♀, May 13, 1907, and 1 ♀ June 15, 1908, Big Indian Valley, (R. F. Pearsall), [A. M. N. H.].¹⁰

⁹ Reported by Johnson (1927: 178) from Strawberry Hill and Bar Harbor; also by Johnson (1925: 94) from the "Upper Aroostook Area."

¹⁰ Reported from Axton, by MacGillivray and Houghton, (1903: 12).

NEW JERSEY:¹¹

PENNSYLVANIA: 1 ♂, Castle Rock, Delaware County, May 17, 1908, [A. N. S. P.]. 1 ♂, Germantown, May 18, 1907, [A. N. S. P.]. 1 ♂, Inglenook, June 3, 1917, (E. Daecke), [Pa. Dept. Agr.]. 1 ♂, Rockville, reared Aug. 26, 1913, (A. B. Champlain), [U. S. N. M.; with pupa skin, Hopkins U. S., no. 10477]. 1 ♀, Pittsburgh, June 8, 1897, [U. S. N. M., ex Aldrich]. 2 ♂, Roxborough, May 9, 1909, (Harbeck), [U. S. N. M., ex Aldrich]; 2 ♂, May 9, 1909 and April 17, 1926, (F. Haimbach), [A. N. S. P., ex Haimbach]; 1 ♂, May 9, 1909, [Hine]. 2 ♂, New Brighton, May 19, 1907, [Brook. Mus., ex Merrick, Museum, Acc. No. 12011].

MARYLAND: 1 ♂, Plummer's Island, May 2, 1902, (H. S. Barber), [U. S. N. M.]; 2 ♂, May 8, 1915, (R. C. Shannon), [Shannon].

DISTRICT OF COLUMBIA: 2 ♂, April 28, 1912, (M. C. Van Duzee), [M. D. Leonard].

VIRGINIA: 2 ♂, Great Falls, April 28, 1915, (R. C. Shannon), [Shannon]; 3 ♂, April 28, 1915, (R. C. Shannon), [U. S. N. M.]; 7 ♂, 3 ♀, May 2 and 11, 1917; 6 ♂, 2 ♀, April 28, 1915, (C. T. Greene), [U. S. N. M., Div. Forest Ins.]. 1 ♂, Dead Run, Fairfax County, May 11, 1916, (R. C. Shannon), [Shannon]; 1 ♂, May 27, 1917, (C. T. Greene), [U. S. N. M., Div. Forest Ins.]; 3 ♂, May 8, 11, 19, 1915; 1 ♂, May 23, 1916, (R. C. Shannon), [U. S. N. M.]. 1 ♀, Falls Church, Apr. 27, 1915, (C. T. Greene), [U. S. N. M., Div. Forest Ins.].

OHIO: 1 ♂, Cincinnati, May 16, [Hine].

MICHIGAN: 1 ♂, East Lansing, April 31, 1892, [Mich. Agr. College].

MINNESOTA: 1 ♀, Basswood Lake, June, (F. L. Washburn), [U. of Minn., No. 11 Sub. 11.].

MONTANA: 1 ♀, LoLo, May 15, 1914, [Mont. Agr. Exp. Sta.].

Notes on Types.—The Museum of Comparative Zoology has the following: Female, "Type Loew Mass."; female, "O. S. Canada"; "female, O. S.," Gorch. N. H.; female, "O. S." White Mts.; female "O. S. Canada"; all as *rufipes*.

I am not at all certain that when more extensive collecting has been done *reflectens* Walk. and *decorus* Williston will not be found to be identical but for the present I prefer to keep them separate. Specimens from the Eastern part of the country are generally smaller, have the wing markings somewhat paler and the dark marking on the hind tibiae tends to be confined for the most part to the apex, and they are apparently referable to *persequus* Walker. Those from the far West tend to be larger, have the wing markings somewhat more distinct, with the hind tibiae entirely reddish or in the male sometimes nearly all dark brownish,

¹¹ Reported from Caldwell, and from Clementon, by Smith in List. Ins. N. J., ed. 3, p. 743 (1910).

especially towards the apex. These seem to be referable to *decorus* Will. Some intergradations occur, however, and several specimens from Eastern Canada are not so typical of *reflectens*. I have seen one or two specimens from British Columbia which apparently belong to *reflectens* and both Coquillett and Hine have referred specimens to this species (as *rufipes* Loew) from that section. I believe that as now understood *reflectens* occurs as far west as B. C. but that *decorus* is chiefly confined to West of the Rockies. However a female taken at Ottawa though slightly small perhaps and with the antennae lacking, I do not hesitate to refer to *decorus*. The only specimen I have seen from Montana, a female, lacks the antennae, and the wing markings though pale are like those of *lugens* Lw. to which it may belong but I tentatively place it with *reflectens* because the legs are yellow with only the apex of the hind tibiae and all the tarsi darkened. It should therefore be borne in mind that care should be exercised before finally referring specimens either *decorus* or *reflectens*.

***Xylophagus triangularis* Say**

1823. *Xylophagus triangularis* Say, Jour. Acad. Nat. Sci. Phila., III, p. 30.

1908. *Erinna triangularis* Kertész, Cat. Dipt., III, p. 137.

This species has not been recognized since it was first described. Macquart¹² suspects this to be a *Subula* (*Xylomyia*) and Malloch (1917: 348) states that he is convinced that Say's species is not a *Xylophagus*. Say however, states that the venation corresponds to that of *Xylophagus ater* Meig. Here follows Say's description:

"Black, sub-glabrous; thorax plumbeous with a black line; feet testaceous.

"Inhabits Missouri.

"Body black; head pale plumbeous; antennae and palpi black; proboscis pale-rufous; trunk black polished; thorax, disk pale plumbeous, with a longitudinal polished black line, gradually and slightly dilating behind; nervures fuscous; halteres white; feet testaceous, tips of the tarsi and of the posterior thighs and tibiae dusky; tergum polished with a large opaque triangle at the base of each segment excepting the first. Length two-fifths of an inch.

"The nervures of the wings are arranged in a similar manner with those of *X. ater* Fab. Meig."

¹² Dipt. Exot., I., p. 171, (1838).

Subfamily ARTHROCERATINAE

Table to Genera of the Subfamily Arthroceratinae

1. Fourth posterior cell open; tibial spurs 0 : 2 : 1.....2
 Fourth posterior cell closed; tibial spurs 0 : 2 : 2.....**Xylomyia**, p. 36
2. Face of ♂ projecting on each side in a rounded, subconical protuberance, thickly covered with hair; that of ♀ less swollen on sides but still distinctly bulbous and with hair somewhat shorter and less dense.....**Glutops**, p. 49
 Face on sides bare and not noticeably swollen in either sex....**Arthroceras**, p. 52

XYLOMYIA Rondani

1820. *Subula* Meigen, Syst. Besch., II, p. 15. (*presen.*)
 1860. *Solva* Walker, Proc. Linn. Soc. London, IV, p. 98.
 1861. *Xylomyia* Rondani, Dipt. Ital. Prodr., IV, p. 11.
 1877. *Macroceromys* Bigot, Bull. Soc. Ent. Fr., 1877, p. LXXIII.

Rather elongate flies, much of the same general habitus as *Xylophagus*; eyes slightly emarginate just above antennae, a character somewhat more pronounced in the male than in the female; eyes separated by hardly more than the width of the ocellar tubercle, about equally distant in both sexes; flagellum of the antennae seven-segmented, the last segment acute at the tip; tibial spurs 0 : 2 : 1 or 0 : 2 : 2; five posterior cells present, the fourth and the anal cell both closed.

GENOTYPE: *Solva inamoena* Walker.

Key to Species of Xylomyia

1. Abdomen for the most part reddish.....4
 Abdomen banded with black and yellow.....2
 Abdomen wholly black.....**aterrima** Johns.
2. Abdomen yellow, basal half of first four segments black; wings dusky, a more distinct band at middle and at tip; species about 10 mm. in length.
 fasciata Say
 Abdomen black, hind border of segments narrowly yellow; wings clear, not banded; species 5 to 6 mm. in length.....3
3. Pleura with a conspicuous, yellow triangular spot
 pallipes flavomaculata n. var.
 Pleura wholly black.....**pallipes** Loew
4. Mesonotum with a prominent, more or less crescentic, yellowish spot on each side in front; all coxae blackish.....**parens** Will.
 Mesonotum not so marked; coxae wholly or in part yellowish.....5

5. First abdominal segment black in the middle, yellowish on the sides; hind border of remaining segments usually edged with black and yellow; mesonotum with two yellow longitudinal stripes in front of sutures

americana Wied.

First abdominal segment wholly black or blackish at base, no yellow on lateral margins, remaining segments wholly reddish; mesonotum without yellow stripes *tenthredinoides* Wulp

***Xylomyia americana* Wiedemann**

1821. *Xylophagus americanus* Wiedemann, Dip. Exot., p. 51.
 1838. *Subula americana* Macquart, Dip. Exot., I, I, p. 171.
 1903. *Xylomyia americana* Johnson, Ent. News, XIV, p. 24.
 1908. *Solva americana* Kertész, Cat. Dip. III, p. 137.

Resembles some of the sawflies; head black; thorax above and on sides black and yellow lined and spotted; abdomen reddish, first segment black in center, broadly yellow on sides, remaining segments narrowly bordered with yellowish, some of them also with blackish; legs mostly red and yellow.

Male.—Length 8 to 12 mm. Head: Black, vertex and front with dense, rather long silvery hair, visible however only in certain lights, two silvery patches of pollen almost confluent just above antennae; face whitish pollinose; antennae blackish segments two and three and first two or three of flagellum more or less reddish inside; palpi and proboscis pale yellowish to reddish brown.

Thorax: Mesonotum black, subshining, the following parts yellow: humeral calli and a large spot on postalar callosities and a somewhat smaller one on lateral border just cephalad of transverse suture, which is connected by a short line with a narrow line on each side extending from inside of humeral calli caudad to wing base; hairs numerous but very fine and pale; pleura yellow and black, polished, the black consisting of two broad somewhat irregular diagonal stripes, the one notched behind and extending from the spiracle situated just below the humeral calli to the base of the middle coxae, the other from the base of the wings to the base of the hind coxae, the two almost meeting below (in a pale specimen this is not so well marked); the upper apex of the propleura also more or less blackish; scutellum blackish, a large yellow spot behind, hairs as on mesonotum; metanotum with a large yellow spot on each side, lateral and caudal border and a large spot behind scutellum blackish, pale hairs on sides; halteres yellowish.

Abdomen: Reddish; first segment black with a large yellow subquadrate spot on either side, polished and with fine pale hairs toward sides; remaining segments subshining, narrowly yellow on caudal margin, yellow sometimes edged with black in front; numerous, minute, pale appressed hairs; hypopygium reddish.

Legs: Coxae yellowish; trochanters concolorous, with a small black spot on apex of each, middle pair with a rather small, and hind pair with a large blackish spot behind; femora yellowish, middle pair on apical third and hind pair on apical

half somewhat reddish; tibiae, front pair yellowish, middle and hind pair reddish, somewhat yellowish at extreme base, hind pair somewhat infuscated towards tip; tarsi yellowish somewhat darkened by fine black hairs, front pair blackish except extreme base of metatarsus.

Wings: Veins dark brownish; membrane hyaline.

Female.—Length, 11.5 mm. Similar to male.

Specimens Examined: 13; 8 males, 5 females.

QUEBEC: 1 ♀, Montreal, [A. M. N. H.].

PENNSYLVANIA: 1 ♂, Charter Oak, July 11, 1917, (J. N. Knull), [Pa. Dept. Agr.]. 1 ♂, Mount Airy, July 14, (P. Laurent), [Pa. Dept. Agr.]. 1 ♂, Pittsburgh, [C. T. Brues]. 1 ♀, Clifton, (C. A. Voelker), [Johnson].

NORTH CAROLINA: 1 ♂, Raleigh, June 2, 1904, (F. Sherman), [U. S. N. M.].

INDIANA: 1 ♂, Elkhart, (R. J. Weith), [Johnson]. 1 ♂, Lafayette, July 13, (J. M. Aldrich) [U. S. N. M.].

ILLINOIS: 1 ♀, "Illinois" [U. S. N. M.].¹³

MISSISSIPPI: 1 ♀, "Mississippi," [U. S. N. M.].

TEXAS: 1 ♀, "Texas," (Belfrage), [U. S. N. M.].

NEBRASKA: 1 ♂, Lincoln, June 6, 1913, (G. W. Deming), [Nebraska].

WYOMING: 1 ♂, "Wyoming" 1881, (Morrison), [U. S. N. M.].

I have seen but a dozen specimens of this handsome species. It is apparently rare in collections. A male from Charter Oak, Pennsylvania has the abdomen pale reddish and the legs nearly wholly yellowish; more of the abdominal segments are edged with black.

Xylomyia aterrima Johnson (Pl. III, fig. 20)

1903. *Xylomyia aterrima* Johnson, Ent. News., XIV. p. 25.

Black, somewhat shining, with following parts pale yellowish: humeral calli; a spot on either side at hind angle of mesonotum just above base of wings; a large spot in middle of scutellum; halteres; posterior half of coxae; extreme tip of femora and base of hind tibiae and tarsi; legs however somewhat variable; wing veins dark brownish, membrane slightly tinged with brownish.

Male.—Length, 10.5 to 11 mm. Similar to female with the following exceptions: eyes a little more noticeably emarginate just above antennae; humeral calli wholly yellow, a conspicuous crescentic spot from humeral calli to wing base bending downward sometimes almost to sternopleural suture, and a spot on either side of metapleura, yellow; halteres usually without brownish spot at base of knob; coxae more nearly wholly yellowish, fore and middle femora and tibiae wholly, and hind femora and tibiae on basal half, yellowish.

¹³ Also reported from Urbana and Algonquin, by Malloch (1917: 343).

Female.—Length, 11 mm. Head: Front and vertex black, covered with fine, short, pale hairs except for a tuft of silvery pubescence on either side just above base of antennae and a bare, shining area just below ocellar tubercle; face black wholly covered with a whitish or silvery pubescence; palpi yellowish brown or brownish yellow, blackish at base; labellum black, bordered with yellowish, below yellowish; antennae blackish, occasionally several basal segments more or less somewhat brownish on inside; eyes very slightly emarginate just above antennae.

Thorax: Mesonotum including the scutellum black, semishining, clothed with fine, pale, appressed hairs which point in various directions, the following parts yellowish; a spot on the humeral calli, sometimes a very narrow line from humeral calli to base of wing, a spot on postalar callosities, and a large spot on disc of scutellum; metanotum blackish, semishining, bare in middle, on sides with fairly long pale hairs; halteres pale yellowish with a brownish spot at base of knob; pleura blackish, semishining, covered with fine pale hairs (noticeably longer just above middle coxae), except a bare shining area behind front coxae extending nearly from the spiracle to the middle coxae and another extending diagonally from base of wing nearly to hind coxae.

Abdomen: Blackish, subshining, covered with fine short, appressed, pale hairs.

Legs: Variable blackish and yellowish somewhat as follows: middle coxae mostly yellowish, front and hind pair usually yellowish only towards apex; femora blackish, front and middle pair often narrowly yellowish towards tip especially on upper surface; front femora usually yellowish along front or upper surface, middle pair usually yellowish except for a blackish ring near base, hind pair usually yellowish near base; tarsi with middle pair somewhat and hind pair more distinctly yellowish at base of metatarsi.

Wings: Veins dark brownish, membrane slightly tinged with grayish; no stigmal spot.

Type.—Male; "Northern Illinois," (Andrew Bolter), [C. W. Johnson's Collection].

Specimens Examined: 26; 7 males, 19 females.

ONTARIO: 1 ♀, Ottawa, June 18, [U. S. N. M.].

NEW HAMPSHIRE: 1 ♀, Franconia, (A. T. Slosson), [Johnson].

NEW YORK: 2 ♀, Irving, July 22, 1917, (M. C. Van Duzee), [Van Duzee]. 1 ♀, North Evans, July 4, 1912, (M. C. Van Duzee); 1 ♀, Rochester Junction, June 9, 1914, (M. D. Leonard); 1 ♀, Renwick, Ithaca, July 12, 1920, (J. L. L. Frank), [all M. D. Leonard].

PENNSYLVANIA: 1 ♂, Roxoboro, May 31, 1908, [A. N. S. P.]. 1 ♂, Philadelphia, September 1; 1 ♀ and pupa case, from inner bark of Carolina Poplar, (P. P. Calvert), April 16, 1914; 1 ♂, Swarthmore, June 13, 1909, (E. T. Cresson, Jr.), [all A. N. S. P.]. 1 ♀ "Pennsylvania", [U. S. N. M., ex Coquillett, no. 1572].

VIRGINIA: 1 ♀, Glencarlyn, May 30, (N. Banks), [Banks].

OHIO: 1 ♀, Cincinnati, May 30–31, 1902; 1 ♀, May 30, 1908, [J. S. Hine].

MICHIGAN: 2 ♀, Ann Arbor, July 4, 1917, (E. G. Anderson); 2 ♂ and 5 ♀, Whitmore Lake, July 3-4, 1917, (E. G. Anderson), [all Shannon].

ILLINOIS: 1 ♂, "Northern Ill.", (Andrew Bolter), [Johnson; *type*].

***Xylomyia fasciata* Say**

1829. *Xylophagus fasciatus* Say, Jour. Acad. Nat. Sci. Phila., VI, p. 155.

1878. *Subula fasciata* Osten Sacken, Cat. Dipt. N. Am., 2nd. Ed., p. 42.

1905. *Xylomyia fasciata* Aldrich, Cat. N. Am. Dipt., p. 212.

1908. *Solva fasciata* Kertész, Cat. Dipt., III, p. 137.

This species has not been recognized since it was described by Say in 1829. Osten Sacken (1878) suggested that it might be the same as *Arthropeas americana* Loew but Johnson (1913: 11) describes specimens which he had of *A. americana* Lw. and compares them with the description of Say's *Xylophagus fasciatus*. He states that the discrepancies between the two are too great to warrant combining them. I believe that this is the case.

Following is a copy of the original description of this species. The sex is not indicated:

"Wings dusky, fasciated, abdomen fasciated.

"Inhab. Indiana.

"Body dusky; thorax—posterior portion honey yellow; poisers blackish at tip; wings dusky, a more distinct band on the middle and at tip; feet honey yellow; hind tibiae blackish; tergum yellow, basal half of the four basal segments black; remaining segments nearly all black.

"Length over $\frac{2}{3}$ of an inch.

"By an accident the head and anterior part of the thorax of this fine specimen were destroyed, but the above description will sufficiently indicate the species. The wing nervures resemble those of *maculatus* Fab."

Since Say stated that "the wing nervures resemble those of *maculatus* Fab." there is probably no doubt that this is a *Xylomyia*. If so, it is the only species of the genus in the United States and Canada with fasciate wings and the position and character of these bands would seem to be similar to those formed in the genus *Xylophagus*.

***Xylomyia pallipes* Loew (Pl. III, fig. 19)**

1863. *Subula pallipes* Loew, Berl. Ent. Zeitschr., VII, p. 6.

1900. *Xylomyia pallipes* Williston, Biol. Cent.-Am., Dip., I, p. 230.

1908. *Solva pallipes* Kertész, Cat. Dipt., III, p. 139.

Black with following parts yellow: basal segments of antennae on inside, a stripe from humeral calli to base of wing, practically

the whole scutellum, a narrow band on hind border of each abdominal segment and the legs except tarsi towards tip; wings clear, no stigmal spot.

Male.—Length 5 to 6 mm. Head: Vertex, ocellar tubercle and front black, seen to be thickly clothed with short whitish hairs when viewed in certain lights; eyes slightly notched just above base of antennae; face slightly bulbous below, black and shining, except near oral margin on each side where it is whitish pubescent; antennae dark brownish, yellowish on inner side of basal five or six segments, third segment wholly yellowish inside, longer and thicker than any of the others; palpi pale yellowish and labellum yellowish, slightly tinged with brownish; both with short whitish hairs.

Thorax: Mesonotum blackish, thickly clothed with short whitish hairs; a spot on the humeral calli and a line connecting this with the base of the wings, yellowish; scutellum shining, yellowish, blackish on each lateral margin, clothed with short, whitish hairs; pleura similar to mesonotum; halteres pale yellowish. Metanotum blackish, somewhat shining on disc.

Abdomen: Blackish, subshining with short whitish hairs as on rest of body; the first segment with a large yellowish spot which occupies nearly the whole dorsal portion and which is semicircular in outline behind, yellowish on caudal border but yellowish border is occasionally almost wanting on segments two and three; hypopygium prominent and yellowish or brownish yellow.

Legs: Pale yellowish; hind femora considerably swollen, and with a number of minute black spines along under side; extreme tip brownish; tarsi slightly brownish towards tip.

Wings: Membrane hyaline; veins dark brownish; no stigmal spot.

Female.—Length, 5.5 to 6 mm. Similar to the male; valves of the ovipositor pale yellowish.

Types.—Specimens from Wisconsin and Illinois in the Museum of Comparative Zoology.

Specimens Examined: About 114 males and females.

ONTARIO: 1 ♀, 1 ♂, Kearney, July 9, (M. C. Van Duzee); 1 ♂, Toronto, July 3, 1911, (M. C. Van Duzee), [all Van Duzee].

NEW HAMPSHIRE: 1 ♀, Franconia, (A. T. Slosson), [A. N. M. H.].¹⁴

MASSACHUSETTS: 1 ♀, Boston, July 26, 1911; and 1 ♂, Cheshire, [B. S. N. H.]. 1 ♂, Plymouth, July 27, 1905, (C. W. Johnson), [B. S. N. H.]. 3 ♀, Beverly, July 7, 1869, and July 1, 1895; 1 ♂, June 6, 1875, (Burgess), [U. S. N. M.].

RHODE ISLAND: 1 ♀, Providence, June 15, (C. A. Davis), [B. S. N. H.].

CONNECTICUT: 1 ♀, New Haven, July 6, 1910, (W. E. Britton), [Conn. Agr. Exp. Sta.].

NEW YORK: 1 ♀, Ithaca, July 14, 1897; 1 ♂, July 19, 1894; 1 ♂, 1 ♀, June 10, 1916; 1 ♀, May 30, 1903, [C. U.]; 1 ♀, June 19, 1891, [U. S. N. M.]; 1 ♀, Aug. 27, 1921, (M. D. Leonard), [Leonard]. 1, Karner, June, [N. Y. S. M.]. 1, Albany, June, and Clinton Heights, June 13, (D. B. Young) [N. Y. S. M.]. 1, Kingston, June 9;

¹⁴ Reported from the "Hanover Area," by Johnson (1925: 94).

1 ♀, Poughkeepsie, Aug. 30, 1903, [N. Y. S. M.]. 1 ♀, Big Indian Valley, June 15, 1908, (R. F. Pearsall), [A. M. N. H.]. 1, Shandakin, June 3, (M. D. Leonard). 1 ♀, White Plains, June 4, 1909, [Brook. Mus.]. 1 ♀, Staten Island, June 12, (W. T. Davis), [Davis]. 1 ♀, Flatbush, July 21, 1891; 4 ♀, June 11, 1897, (J. L. Zabriskie), [A. M. N. H.]. 1, Lott Wood, June 28, 1893, (J. L. Zabriskie), [A. M. N. H.]. 2 ♀, Cold Spring Harbor, July 25 and 28, 1900, [A. M. N. H.]. 1 ♂, Flushing, May 25, 1918, (J. Bequaert), [A. M. N. H.]. 1 ♀, Sea Cliff, (N. Banks), [Banks].

NEW JERSEY: 1 ♂, National Park, June 3, 1905, (E. Daecke), [Pa. Dept. Agr.]. 1 ♀, Washington Park, Camden, June 30, 1906, (E. Daecke), [Pa. Dept. Agr.]. 1 ♀, Hemlock Falls, July, [A. M. N. H.]. 1 ♀, Lahaway, (J. Bequaert), [A. M. N. H.].¹⁵

PENNSYLVANIA: 1 ♂, 2 ♀, Dauphin, June 10, 1917, (E. Daecke); 1 ♂, Mechanismburg, June 2, 1908; 1 ♂, Mt. Airy, June 2, 1903, [all Pa. Dept. Agr.]. 1 ♀, "Pennsylvania," [U. S. N. M.]. 2 ♂, Pennsylvania, [Univ. of Kansas]. 1 ♀, Stoverdale, June 13, 1916, (W. S. Fisher), [U. S. N. M.].

DISTRICT OF COLUMBIA: 1 ♂, Washington, June 29, 1908, [Biol. Surv.]. 1 ♀, July, 1904, (Wm. Palmer), [U. S. N. M.]. 1 ? "D. C.," [A. M. N. H.]. 1 ♀, Brookland, Aug. 7, 1914, (R. C. Shannon), [Shannon].

MARYLAND: 1 ♀, Plummer's Island, June 2, 1912, [U. S. Biol. Surv.]. 1 ♀, June 27, 1915; 1 ♀, June 9, 1914, (R. C. Shannon), [U. S. N. M.]. 1 ♀, Camp Meade, May to June, 1919, (R. C. Shannon), [Shannon].

VIRGINIA: 1 ♂, Bluemont, July 1, 1914, (W. L. McAtee), [Biol. Surv.]. 1 —, June 4, 1912, (C. T. Greene), [U. S. N. M.]. 1 ♀, Dead Run, June 9, 1915; 1 ♀, June 29, 1915; 1 ♀, July 15, 1915, (R. C. Shannon), [Shannon]. 3 ♀, Chain Bridge, May 24, 1915, with puparia, reared; 1 ♀, July 10, 1912; 1 ♀, June 4, 1912; 4 ♀, July 8, 1914; 1 ♀, June 12, 1912, (C. T. Greene), 2 ♀, July 20, 1912 (F. Knab), [all U. S. N. M.]. 1 ♀, Arlington Farm, [U. S. N. M.; Hopkins no. U. S. 6062]. 1 ♀, Falls Church, July 13, 1913, (F. Knab), [U. S. N. M.]. 1 ♀, June 18, 1912, (Wm. Middleton), [U. S. N. M.]. 1 ♀, Shipman, May 14, 1913, (T. E. Snyder), [U. S. N. M.]. 1 ♀, May 6, 1911, (N. Banks), [Cole].

NORTH CAROLINA: 3 ♀, Biltmore, June 26, 1912; 1 ♀, June 27, 1912, (W. L. McAtee), [Biol. Surv.]. 1 ♀, Valley of the Black Mountains, June 24-30, 1906, (Wm. Beutenmueller), [A. M. N. H.]. 1 ♀, Hot Springs, (A. T. Slosson), [A. M. N. H.]. 1 —, Elizabeth City, late August 1919, (F. Sherman), [Hine det. in N. C. Dept. Agr.].

MISSISSIPPI: 1 ♀, Holly Springs, (F. W. Mally), [U. S. N. M.].

OHIO: 1 ♀, Wooster, Feb. 26, 1901, [Ohio Agr. Exp. Sta.; A. C. No. 4013].

INDIANA: 7 ♂ and 2 ♀, Lafayette, July 10 and 23 and 1 ♀, June 29, 1916, (J. M. Aldrich), [U. S. N. M.].

ILLINOIS: "Ill.," [M. C. Z.; type].

WISCONSIN: "Wis.," [M. C. Z.; type]. 1 ♂, Polk Co., July, (C. F. Baker), [U. S. N. M.].

¹⁵ Recorded from New Brunswick, Lahaway, National Park, and Westville, by Smith in Ins. N. J., 3 ed., p. 743, (1910).

MINNESOTA: 1 ♀, Olmsted County, July, 1905, (C. N. Ainslee), [U. of Minn.].

MONTANA: 1, Powderville, June 15, 1916, (R. W. Kellogg), [Biol. Surv.]¹⁶

WYOMING: 2 ♂, 2 ♀, "Wyoming," [U. S. N. M.].

KANSAS: 1 ♂, 2 ♀, Riley County, July 8, (Popenoe), [Kansas]; 1 ♂, July 12, (J. B. Norton); 1 ♂, June 12, (F. Marlatt); 1 ♀, Lawrence, June, (E. S. Tucker), [N. Y. S. M.]; 3 ♀, June 8, [U. S. N. M.]. 1 ♂, Onaga, (Crevecour), [U. S. N. M.].¹⁷

COLORADO: 1 ♂, Denver, August, (E. S. Tucker), [Stanford Univ.; F. R. Cole det.]. 2 ♀, "Col." [Mont. Agr. Exp. Sta.]. "Colorado," 1 —, [Kansas].¹⁸

UTAH: 1 ♀, Salt Lake City, July 8 to 20, 1917, [U. S. N. M.].

NEW MEXICO: 1 ♂, "N. Mex.," May 13, 1911, (J. H. Watson), [U. S. N. M.]. 1 ♀, "N. Mex.," May 14, 1911, (A. O. Weese?), [U. S. N. M.].

CALIFORNIA:¹⁹

Malloch (1917: 341) suggests that *pallipes* may not be congeneric with the other species as good larval and pupal characters exist for its separation. This may be true, as its general habitus is different from the other *Xylomyia*e and the swollen hind femora with the minute spines beneath may be further argument to separate it.

Biology.—The larva is described and figured by Malloch (1917: 342) from specimens collected under the bark of a felled tree where they were predaceous upon the larvae of *Euxesta*, *Lonchaea* and *Heteromerina*. The pupa and puparium is described by Townsend²⁰ from specimens bred from maggots and puparia taken under the bark of a cottonwood tree by C. P. Gillette at Fort Collins, Colorado.

Habitat.—This fly is said by Malloch (1917: 343) to occur commonly on tree trunks in June, July, and August throughout Illinois.

Xylomyia pallipes Loew var. *flavomaculata* new variety

A single male specimen from N. Yucatan, differs so markedly in several respects from all the other specimens of *X. pallipes* I have seen that it is here described as a new variety of that species, even though it is without the faunal limits of this paper.

¹⁶ Also reported from "Montana, Prof. Comstock, no. 50" by Williston (1885: 122).

¹⁷ Reported from Douglas County, by Snow (1903: 212), and in May to July at twilight, by Tucker (1907: 89).

¹⁸ Recorded from Trinidad, by Baker in Ent. News, VI, p. 172, (1895).

¹⁹ Reported from "S. Cal." by Williston (1885: 22).

²⁰ Can. Ent., IV, pp. 163-165, (1893).

Male.—Length, 5.5 mm. Differs from the typical *X. pallipes* as follows: Basal four segments of antennae wholly brownish yellow, legs more of a brownish yellow in color; hind coxae reddish brown, middle coxae tinged with same color; tarsi more distinctly brownish; abdominal segments margined with dull reddish behind; no yellow basal spot on abdomen. The most distinctive difference, however, is the presence of a large yellowish triangular spot on upper portion of the pleura between base of wing and the humeral callus.

Female.—Unknown.

Type.—Male; Northern Yucatan, collected by Gaumer, no date, [American Museum of Natural History Collection]. This may be the specimen upon which the "Biologia" reference is based "N. Yucatan (Gaumer)."²¹

***Xylomyia parens* Williston**

1885. *Subula parens* Williston, Can. Ent. xvii, p. 122.

1904. *Xylomyia parens* Howe, Can. Ent., xxxvi, p. 86.

1908. *Solva parens* Kertész, Cat. Dip., III, p. 139.

Black, abdomen brownish red, black at base; thorax with a yellow crescent on each side in front, a yellow spot on each side just in front of scutellum and a large yellow spot on either side of metanotum; humeri with a yellow spot; legs orange yellow, apex of hind femora broadly blackish, of the hind tibiae broadly dark brownish.

Male.—Length, 12 mm. Head: Black; vertex, ocellar tubercle, and front, except a small shining spot just below ocellar tubercle, with short rather yellowish hairs; face slightly bulbous below and more or less whitish pubescent; when seen in certain lights there appears to be a more or less distinct spot of whitish pubescence on either side just above and below base of antennae; palpi blackish on basal half, brownish yellow on apical portion and with a few blackish hairs on the darker portion; proboscis yellowish, a blackish spot above on each side near base; antennae dark brownish, the whole inner surface, except extreme tip and the basal segment, reddish brown.

Thorax: Mesonotum blackish, wholly covered with fine short yellowish hairs, semishining, the following parts yellow: a crescentic shaped spot on either side beginning just inside the humeral callus and including it and behind curving inward at the transverse suture towards the median line; an elongate spot on each side just above the base of the wing; a minute spot on the hind angles of the scutellum and an elongate spot on each side of the metanotum just in front of the halteres; pleura black; for the most part with fine short hairs except an area just above the middle coxae which is bare and polished; a conspicuous yellow line extends from the humeral calli to the base of the wing where it bends downwards at a right angle and runs to the sternopleural suture; three more or less distinct small yellowish

²¹ Biol. Am.-Cent., Dip., I, p. 230, (1900).

spots on the sclerite below base of wings; halteres yellowish, knobs tinged with reddish.

Abdomen: A rather pale reddish brown, the short hairs less noticeable than on the thorax, basal segment a pale yellowish, broadly margined in front and narrowly behind with blackish, the black in neither case reaching the lateral margin; a more or less interrupted darker line extends the length of the extreme lateral border; hypopygium prominent, yellowish brown.

Legs: Coxae and trochanters blackish, the first two pairs of the former somewhat brownish in front; remainder of legs orange yellow; a broad apical ring of black on the hind femora and of dark brownish on the hind tibiae.

Wings: Veins brownish; membrane strongly tinged with brownish yellow.

Female.—Length, 14 to 14.5 mm. Similar to the male with the following exceptions: Thorax: the yellow not so bright and the caudal portion of the crescent represented only by a narrow yellow line in one specimen and in another by only a small yellowish elongate spot on the suture; the sclerite below the base of the wings almost wholly blackish; halteres slightly paler.

Abdomen: One specimen with basal segment wholly and the second segment mostly, blackish; another with the two basal segments wholly blackish; the remaining segments a darker reddish brown; the lateral blackish line is more distinct than in the male.

Legs: Coxae wholly black; the yellow parts apparently with no orange tinge.

Holotype.—Female; Western Washington Territory, (H. K. Morrison), [U. S. National Museum Collection].

Allotype.—To my knowledge the male has not previously been described. One specimen only is before me from Corvallis, Ore., collected by Edwin Dunn, May 29, 1915, [Oregon Agricultural College Collection].

Specimens Examined: 8; 2 males, 6 females.

BRITISH COLUMBIA: 1 ♀, "B. C.,"? [R. S. Sherman].²²

WASHINGTON: 1 ♂, 1 ♀, Seattle, (O. B. Johnson), [Univ. Wash.]. 1 ♀, "Wash. Terr.," (H. K. Morrison), [U. S. N. M.; *type*]. 1 ♀, "W. Wash. Terr.," (H. K. Morrison), [U. S. N. M.].

OREGON: 1 ♂, Corvallis, May 29, 1915, (Edwin Dunn), [Ore. Agr. College].*

CALIFORNIA: 1 ♀, Lower Lake, Cash Creek, May 10, 1926, (M. C. Van Duzee), [Van Duzee]. 1 ♀, Sonoma County, (A. Kusche), [Brook. Mus.].

***Xylomyia tenthredinoides* Van der Wulp**

1867. *Subula tenthredinoides* Van der Wulp, Tidschr. v. Ent., x, p. 32.

1903. *Xylomyia tenthredinoides* Johnson, Ent. News, xiv, p. 24.

1908. *Solva tenthredinoides* Kertész, Cat. Dip., III, p. 139.

1917. *Xylomyia pallidifemur* Malloch, Bul. Ill. State Lab. Nat. Hist., XII, p. 343.

²² Also reported by Hine (1904: 86 and 89) from Vancouver, and Victoria.

* Also reported from Corvallis, July 18, by Cole and Lovett (1921: 237).

Mesonotum varies from reddish to blackish, two yellow spots behind and one cephalad; scutellum and humeral calli yellow; pleura blackish to yellow and black; abdomen blackish at base and sometimes at tip, otherwise reddish; legs yellowish to reddish, hind femora and tibiae often blackish on apical half; wings clear. Closely related to *X. americana* Wied. which it resembles in many ways.

Male.—Length, 8 to 10 mm. Head: Similar to that of *X. americana* Wied., hairs however more golden and silvery patches above antennae perhaps a little more separated.

Thorax: Mesonotum reddish to blackish, subshining, the humeral calli usually, and often the postalar calli and the transverse suture narrowly yellowish; in those specimens in which the reddish predominates there is usually blackish in front, above wing bases and on part of the scutellum, and sometimes a narrow median line, but all these areas narrowly or broadly blackish and every gradation occurs between the mesothorax with red and black predominating; hairs yellowish, fine, appressed and arranged in patches in which they are curved in various directions, more noticeable on the darker specimens; scutellum yellow, narrowly blackish on each side, shining; pleura very similar to those of *X. americana* but the anterior black stripe is shorter and more nearly vertical, almost meeting in behind the upper part of front coxae; metanotum black with a large subquadrate yellow spot on either side; halteres yellowish, sometimes with knob reddish.

Abdomen: Pale reddish to almost reddish brown, subshining; occasionally wholly strongly tinged with blackish or with the apical third or half blackish, in darker specimens the first segment is wholly black, in the paler ones only the basal part; sutures often showing as narrow paler bands; first two or three segments often narrowly edged with blackish on lateral border; hairs moderately abundant, fine, pale and appressed, a few long pale erect hairs at base of abdomen; hypopygium when exerted seen to be large and reddish.

Legs: Front and middle pairs including coxae wholly pale yellow, apical segments of tarsi somewhat infuscated; hind legs somewhat variable; coxae pale yellowish, sometimes slightly tinged with blackish in front; femora yellowish on basal half, in paler specimens more reddish on apical half sometimes with extreme apex slightly infuscated, or in darker specimens with quite a distinct ring of blackish at base and apex of apical reddish half; intergradations in intensity of these markings occur between the two types just mentioned; tibiae somewhat reddish usually more yellowish at base and sometimes with extreme apex slightly infuscated, in darker specimens often a ring of blackish at base and apex of reddish area as in tibiae; tarsi pale yellowish usually infuscated, except most of metatarsus.

Wings: Membrane clear; veins dark and pale brown.

Female.—Length, 9 to 13 mm. Similar to male except as follows: Pleura variable, the two black stripes sometimes confluent above on the mesopleurum or the anterior stripe may reach the middle coxa as in *americana* Wied; sometimes the

whole pleura and metanotum entirely blackish; in other specimens they may be blackish but with a brownish to somewhat yellowish area just in front of wings on mesopleura and with a large yellowish spot on propleura; tip of abdomen sometimes black; coxae markings somewhat but not always correlated with pleura markings, hind coxae blackish on anterior surface or wholly so except a little yellow on posterior surface, the two front pairs more or less blackish in front; remainder of legs vary much as in male.

Type.—Female; "Wisconsin."

Specimens Examined: About 103 males and females.

NEW BRUNSWICK: 1 ♂, Nerepis, June 22, (A. G. Leavitt), [U. S. N. M.].

NEW HAMPSHIRE: 1 ♀, Bretton Woods, June 29, 1913, (C. W. Johnson), [B. S. N. H.].

MASSACHUSETTS: 1 ♀, Bass Rocks, June?, [A. N. S. P., ex Dietz]. 1 ♂, Beverley, July 10, [U. S. N. M.].

CONNECTICUT: 1 ♀, Pleasant Valley, (J. Bequaert), [A. M. N. H.].

NEW YORK: 1 ♂, Niagara Falls, June 9, 1912, (M. C. Van Duzee), [Leonard]. 1 ♂, South Wales, June 22, 1912, (M. C. Van Duzee), [Leonard]. 2 ♀, Ithaca, (O. A. Johannsen), [C. U.]. 1 ♂, Ithaca, (P. D. Harwood), June 25, 1928, [Rice Institute]. 1 —, Poughkeepsie, June 3, (D. B. Young), [N. Y. S. M.]. 1 ♂, New York City, June 12, 1909, [Davis]. 1 ♂, Richmond Hill, July 3, 1905, [Pa. Dept. Agr.].

NEW JERSEY: 1 ♀, Fort Lee, June 23, 1904, [Pa. Dept. Agr.]. 1 ♂, Forest Hill, June; 1 ♂, Newark, June; 1 —, Hemlock Falls, August, [all A. M. N. H.]. 1 ♂, Wenonah, June 25, 1907, [A. N. S. P.].

PENNSYLVANIA: 1 ♀, Camp Hill, June 7, 1912; 1 ♂, June 2, 1911, [Pa. Dept. Agr.]; 2 ♂, 3 ♀, June 23, 1911, (Kirk and Fisher), [Walton]. 2 ♀, June 21, 1917, (W. S. Fisher), [Leonard]. 1 ♀, Harrisburg, July 10, 1917, [Pa. Dept. Agr.]; 1 ♀, [Walton]; 1 ♀, June 13, 1912, (A. B. Champlain), [Walton]. 1 ♀, Charter Oak, June 20, 1917, (H. B. Kirk); 1 ♀, York, June 6, 1918; 4 ♂, Castle Rock, June 1, 1902; 1 ♀, June 30, 1907; 2 ♀, June 3, 1904; 1 ♀, June 10, 1905, [all Pa. Dept. Agr.]; 19 ♂, June 3–9 [A. N. S. P.]; 1 ♀, May 29, 1904, (E. Daecke), [Leland Stanford Univ.; Cole det.]; June 3, [Van Duzee]; 1 ♂, 1 ♀, June 1904, [Brook. Mus.]; 1 ♀, June 3, 1906, (C. T. Greene), [U. S. N. M.]. 1 ♀, Roxboro, June 26, (F. Haimbach), [A. N. S. P., ex Haimbach]. 1 ♂, Natrona, July 12; 1 ♀, New Brighton, July 17, 1907, [Brook. Mus.]. 1 ♀, Delaware Water Gap, June 24, (A. T. Slosson), [A. M. N. H.]. 1 ♂, New Cumberland, June 16, 1903; 1 ♂, May 30, (W. R. Walton), [Walton]. 2 ♂, 3 ♀, Allegany; 1 ♀, North East, June 13, 1916, (R. A. Cushman); 2 ♀, Pittsburg, June 16, 1897, (J. M. Aldrich); 2 ♂, 1 ♀, Washington County, June 15, 1897, (Ehrman), [all U. S. N. M.]. 1 ♀, Swarthmore, Delaware County, June 11, (E. T. Cresson Jr.), [A. N. S. P.].

DISTRICT OF COLUMBIA: 1 ♂, 1 ♀, Georgetown, (H. H. Smith); 4 ♂, Washington, [all U. S. N. M.].

MARYLAND: 1 ♀, Plummers Island, June 2, 1912; 1 ♂, June 2, 1916, (W. L. McAtee), [Biol. Surv.]; 2 ♂, June 3, 1914 and 1916, (R. C. Shannon), [Shannon].

I ♀, June 7, 1908, (W. L. McAtee); I ♀, June 8, 1902, (H. S. Barber), [all U. S. N. M.]. 2 ♂. Camp Meade, May-June, (R. C. Shannon), [Shannon]. I ♂, Cabin John, Aug. 1916, (R. M. Fouts), [Walton]. I ♂, June 1917, (R. M. Fouts), [U. S. N. M.]. 3 ♂, 4 ♀, June 3, 1913, (R. C. Shannon), [Shannon].

VIRGINIA: I ♂, Dead Run, May 23, 1915, (R. C. Shannon), [Cole]. I ♂, June 29, 1913, (R. C. Shannon); I ♀, Dixie Landing, July 4, (C. H. T. Townsend); I ♂, Falls Church, June 7, 1914, (R. C. Shannon), [all U. S. N. M.].

NORTH CAROLINA: I ♂, Raleigh, May 23, 1921, (C. S. Brimley), [No. Car.].

ALABAMA: I ♀, Coosa River, Chilton County, (H. H. Smith), [U. S. N. M.].

OHIO: I ♂, I ♀, Cincinnati, June 9-16, 1901; I ♀, May 30-31, 1902, [Hine]. I ♀, Wooster, July 15, (Q. Lowry), [N. H. Agr. College].

MICHIGAN: I ♀, Whitmore Lake, July 3, 1917; I ♀, Ann Arbor, July 4, 1917, (E. G. Anderson), [Shannon].

WISCONSIN: I ♀, Rochester, July 15, 1890, [A. M. N. H.]. I ♀, Milwaukee, Aug. 10, [U. S. N. M.].

MINNESOTA: I ♂, "Minnesota," [U. S. N. M.]. I ♀, "Minnesota," [U. of Minn.; No. 13 sub. 24].

ILLINOIS: I ♀, Algonquin, June 9, (W. A. Nason), [C. W. Johnson].²³

KANSAS: I ♀, "Kansas," [U. S. N. M.; det. Coquillett as *X. parens* Will.].

NEBRASKA: I ♂, Rulo, July 1, 1915, (E. M. Partridge), [Nebraska].

I cannot consider *Xylomyia pallidifemur* Malloch as anything but a synonym of *tenthredinoides*. All gradations occur between the markings of the mesonotum, pleura, coxae and hind legs of what Malloch considers as *tenthredinoides* and *pallidifemur*.

He separates them somewhat as follows (Malloch; 1917: 341):

1. Pleura entirely black; hind femora reddish yellow. **pallidifemur** ♀
Pleura partly yellow. 2.
2. Hind coxae blackened in front; hind femora reddish yellow; eyes separated by less than one-sixth the head-width; furcation of fourth and fifth branches of radius distinctly distad of a line drawn from apex of third branch of that vein to point of furcation of first and second branches of media. . **pallidifemur** ♂
Hind coxae yellow; hind femora darkened on apical third; eyes separated by more than one-fifth the head width; furcation of fourth and fifth branches of radius distinctly proximad of, or in line with, a line drawn from the apex of that vein to point of furcation of first and second branches of media

tenthredinoides

In the series of over one hundred specimens which I have examined from the states listed above I can see no appreciable difference in the distance the eyes are separated in the males of what might be otherwise referable to *pallidifemur*, from those which I call

²³ Also reported from Urbana, St. Joseph, Augerville, and Grand Tower, by Malloch (1917: 343).

tenthredinoides. In regard to the venational character on which the male of *pallidifemur* is separated, I have seen no males otherwise referable to either species, which do not have the fork of R_{4+5} distad of a line drawn from the apex of R_{1+2} , through the point of furcation of M_{1+2} , although in a few cases the fork of R_{4+5} is nearly on such a line. An examination of Van der Wulp's excellent figure of *tenthredinoides*, although it is a female, shows this fork distinctly distad of such a line.

GLUTOPS Burgess

1878. *Glutops* Burgess, Proc. Bost. Soc. Nat. Hist., XIX, p. 321.

Flies of moderate size and fairly robust in appearance, hairy; antennae with first three segments longer than wide, subequal, the first two more or less hairy, especially above, flagellum a little longer than third segment, stout, rather blunt at apex and indistinctly divided into five, or six segments; face of male with two large hairy bulbous protuberances, separated by a deep groove in the middle and with a median globose swelling below as in *Chrysopilus*; face of the female less swollen on sides but still distinctly bulbous and with the hairs shorter and less dense; tibial spurs 0 : 2 : 1; fourth posterior and anal cells open.

GENOTYPE: *Glutops singularis* Burgess.

Glutops singularis Burgess

1878. *Glutops singularis* Burgess, Proc. Bost. Soc. Nat. Hist., XIX, p. 19: 322.

Blackish, at once distinguishable from all other Rhagionidae by the presence of two prominent bulbous protuberances which occupy nearly the whole face and which with palpi, thorax, abdomen and femora are clothed with long dense blackish hairs, but longer and denser on the facial bulbs; antennae reddish, black at tip with long hairs at base; legs dark brown.

Male. (Type redescribed). Length, slightly less than 8 mm. Head: Face and cheeks black, light gray pollinose, face produced into two bulbous protuberances which nearly meet in the middle, a smaller median bulbous swelling also present similar to that in *Chrysopilus*: eyes broadly contiguous, broader than high and somewhat concave above the antennae which arise but little ventrad of the ocellar tubercle due to the distortion of the face; palpi and proboscis reddish brown; the two facial protuberances, the cheeks, occiput, ocellar tubercle, palpi and base of proboscis all with dense long black hairs, densest and longest on the facial protuberances where they hang down like a curtain and have a distinct brownish cast in

certain lights; antennae reddish somewhat tinged with brown, the basal half of the third segment almost whitish and the terminal half of the flagellum black; the first two segments with long black hairs, longer and more abundant above on both, the third with a single long black hair directed apicad; the exact segmentation of the flagellum is difficult to make out, but I count five or six segments on the ental aspect and but five on the ectal; the comparative length of the antennal segments and arrangements of the hairs are shown in figure 2.



Glutops singularis Burgess. (type, ♂ × 50).

Fig. 2. Antennae, ental aspect. Fig. 3. third antennal segment and flagellum, ectal aspect.

Thorax: Black in ground color; mesonotum light grayish pollinose, with dense, moderately black hairs and with apparently four indistinct narrow dusky longitudinal stripes; scutellum also pollinose, with hairs about twice as long as on mesonotum; pleura light gray pollinose with long blackish hairs, unevenly distributed; metanotum and metapleura concolorous, bare, the swelling of the latter very slight; halteres with stem brownish yellow, knob darkened.

Abdomen: Subglobose, black in ground color, light gray pollinose, wholly covered with long dense black hairs; indefinite and somewhat darker areas along median line which are probably due to rubbing of the pollen; hypogygium bulbous, prominent and with long black hairs.

Legs: Coxae concolorous with pleura, with long, somewhat curling black hairs; remainder of legs dark brownish, tarsi somewhat darker, the front pair wholly and the tips of the segments of the hind pair; femora clothed with moderately dense, long black hairs.

Wings: Rather narrow; membrane distinctly tinged with brownish especially on costal border; veins dark brownish; stigma dark brown, elongate.

Female.—Altho I have seen Mr. Johnson's specimen I quote herewith his full description since it is very complete:²⁴

"A female of this rare fly was taken by the writer along the 'Red Cross Trail,' on Mt. Monadnock, N. H., June 10, 1920, at an elevation of about 1,800 feet. It has not been described, and as it differs considerably from the male, seems to warrant a description.

"The bluish-gray coloring of the entire insect is noticeably lighter and the hairs of the face, thorax and abdomen about one-third the length of those of the male, antennae yellow, the hairs on the first and second joints about one-third the length

²⁴ Psyche, xxvii, pp. 153-154, (1920).

of those on the male, outer half of the annuli black, and the hairs on the palpi much shorter. Front slightly wider than the width of each eye, flat, with numerous short, black hairs, except at the lower angles and above the base of the antennae, ocelligerous tubercle prominent, ocelli shining black, occiput more protruding than in the male, and the hairs about one-third as long. The vertical angle is obsolete and the area below is not depressed as in the male, but protruding, with narrow depressions on each side extending toward the margin below the inner corners of the eyes. The rounded facial prominences are not as "conical" as in the male, and are separated by the width of the base of the antennae. On each side of the antennae extend deep furrows diverging towards the mouth, forming a rounded, elevated epistoma, with a narrow contracted area above extending to the base of the antennae. The thoracic stripes are brown and narrower than in the male, the metanotum just below the scutellum white. The base of the first abdominal segment shows two depressed, subdorsal areas, base of the second and the fifth, sixth and seventh segments, and the tip of the ovipositor, brown. The halteres and legs as a whole are slightly lighter in color and wings broader than in the male. Length the same, 8 mm.

"The male was described by Edward Burgess (1878: 320) from a specimen collected about 1872 near the United States Arsenal, Springfield, Massachusetts, by Dr. George Dimmock. It was next captured by Mr. William Reiff near Ellis Station, Norwood, Massachusetts, April 18, 1909 and recorded by the writer.²⁵ It was again taken by Mr. Reiff April 21, 1912, and by the writer at the same locality, May 3, 1918. I have also received a specimen for determination from Mr. H. L. Johnson, collected at South Meriden, Connecticut, April 17, 1915.

In 1917, Mr. Arthur Gibson²⁶ recorded this species from Agassiz, British Columbia, June 1915, collected by R. C. Treherne." [This, however, is undoubtedly a new species.]

In addition, in his List Diptera New England, p. 94, Mr. Johnson also records the species from Whateley, Massachusetts, May 6, 1923 (C. P. Alexander).

Dr. Alexander has also taken a male on the eastern slope of Mt. Toby, near Amherst, Mass., May 14, 1927 [Crampton Coll., Mass. Agr. College].

In New York a male was taken at Ithaca, April 14, 1922 and a female at McLean in 1924.

A female was captured by E. T. Cresson, Jr.²⁷ in a woods along Dismal Run, Delaware County, Pennsylvania, April 18, 1925, flying near a leaf covered brook.

²⁵ *Psyche*, xvi, p. 132, (1909).

²⁶ *Ann. Rept. Ent. Soc. Ont.*, 47th, p. 154, (1916).

²⁷ *Ent. News*, xxxvi, p. 211, (1925).

Type.—A single male from Springfield, Massachusetts, (Geo. Dimmock), in the U. S. National Museum, without type number; the right antenna is lacking.

ARTHROCERAS Williston

1886. *Arthroceras* Williston, Ent. Am., II, p. 107.

Somewhat resembling certain *Chrysopilus* species in general appearance, e.g. *C. quadratus* Say; eyes of the males broadly contiguous, of the females broadly separated, in the latter the front is wider above than below, just above the antennae being about the width of the eyes; flagellum of the antennae seven-segmented, tapering toward tip, the last segment elongate and acute at tip; tibial spurs 0 : 2 : 1; five posterior cells present, both the fourth posterior cell and anal cell open.

GENOTYPE: *Arthroceras pollinosum* Williston.

Key to Species of *Arthroceras*

- Mesonotum wholly ochraceous pollinose; knob of halteres yellowish in female, blackish in male; 5 to 7 mm. in length (a somewhat smaller Western species) ***pollinosum* Will.**
 Mesonotum more of a light grayish pollinose, with three broad dark brown stripes; knob of halteres blackish in both sexes; 7 to 9 mm. (a somewhat larger Eastern species).....***leptis* O. S.**

Arthroceras leptis Osten Sacken

1878. *Arthropeas leptis* Osten Sacken, Cat. N. Am. Dip., Rev. Ed., p. 223.

1886. *Arthroceras leptis* Williston, Ent. Am., II, p. 107.

Grayish pollinose, halteres brownish yellow, the knobs blackish; mesonotum with three broad dark brown stripes, the median one narrowly divided; legs brownish, the femora dark brownish and the tarsi tinged with the same color especially on the last segment, wings somewhat tinged with brownish yellow, especially along the costal border, stigma pale brownish, elongate.

Male.—Length 7 mm. Head: Face and frontal triangle light gray pollinose; sides of face bare; palpi and proboscis dark brownish, the former together with the cheeks, with long abundant yellowish hairs; frontal triangle with short pale hairs; antennae blackish, second segment paler at tip.

Thorax: Mesonotum grayish pollinose almost wholly obscured however, by three broad dark brown stripes the median one of ten narrowly divided; scutellum dark brown, mostly grayish pollinose; pleura grayish pollinose, propleural and meta-

pleural hairs yellowish; halteres brownish yellow, knob almost black; metanotum grayish pollinose. Mesonotum and scutellum rather long and with rather abundant fine yellowish hairs.

Abdomen: Almost blackish in ground color, grayish pollinose, a little subshining, with fairly abundant, fine, moderately long, somewhat appressed yellowish hairs.

Legs: Coxae almost blackish in ground color, grayish pollinose, hairs yellowish; femora dark brown, slightly paler at extreme tip; tibiae and tarsi brownish yellow, the tarsal segments tipped with dark brown.

Wings: Membrane tinged with pale brownish yellow; veins pale brownish; stigma elongate, brownish yellow.

Female.—Length, 7 to 9 mm. Similar to male with the following exceptions: front just above the antennae almost three quarters the width of the eye, wider above, somewhat of a satiny brown except a narrow border of light gray pollen along each eye, sparsely covered with short yellowish hairs; palpal, mesonotal and abdominal hairs somewhat shorter.

Specimens Examined: 18; 3 males, 15 females.

ONTARIO: 1 ♂, Sudbury, July 14, 1897, [C. N. M.]. 1 ♂, Burke Falls, July 12, 1926, (F. P. Ide), [C. N. M.].

NEW HAMPSHIRE: 1 ♂, 3 ♀, White Mountains, (Morrison), [A. M. N. H.]. 4 ♀, Mount Washington, (A. T. Slosson), [U. S. N. M.]. 1 ♀, Aug. 7, 1909, [B. S. N. H.]; 1 ♀, near summit, July 25, 1875, (Geo. Dimmock); 1 ♀, at the Base Station, July 30, 1912, (F. W. Dodge), [B. S. N. H.].²⁸

NEW YORK: 1 ♀, Lake Tear, Essex County, 4300–4600 ft., July 20, 1920, (J. Bequaert), [Bequaert].

MICHIGAN: 3 ♀, Marquette, Shore of Lake Superior, 1911, [Davis]. 1 ♀, Pequaming, July 5, 1903, (Morgan Hebard), [Pa. Dept. Agr., ex Daecke].

Several females I have seen including one of the types are wholly pale brownish almost ochraceous, with the knob of the halteres and the legs concolorous. These, as Osten Sacken suggested in regard to the type female so colored, are probably teneral and undoubtedly belong to this species. They have the mesonotum quite distinctly trivittate.

***Arthroceras pollinosum* Williston**

1886. *Arthroceras pollinosum* Williston, Ent. Am., II, p. 108.

1910. *Arthroceras pollinosus* Coquillett, Proc. U. S. Nat. Mus., xxxvii, p. 510.

Blackish in ground color but wholly heavily overlaid by pollen which in the male is for the most part light grayish, except on the thorax, where it is almost wholly ochraceous and on the abdomen where it is somewhat tinged with ochraceous. In the female the abdomen is more nearly wholly ochraceous pollinose and the upper

²⁸ Previously reported from Mount Washington by Johnson (1913: 10).

part of the pleura are somewhat tinged with this color; antennae in both sexes blackish, paler towards base, legs a rather dirty yellow, in female tarsi blackish except base broadly, in male femora mostly and tarsi except base narrowly, blackish. Wings strongly tinged with ochraceous.

Male.—Length, 5.5 mm. Head: Face and frontal triangle light gray pollinose, sides of face bare; palpi and proboscis blackish with fine whitish hairs, longer and more numerous on the former; cheeks and frontal triangle with long abundant whitish hairs; antennae bare, blackish except the third segment and the tip of the second which are paler.

Thorax: Mesonotum and scutellum heavily ochraceous pollinose, the latter more grayish on the margin, both with long fine whitish or yellowish hairs; pleura light gray pollinose, bare except for usual propleural and metapleural hairs and a few other scattered ones which are whitish; halteres brownish yellowish, the knobs blackish; metapleurum light gray pollinose.

Abdomen: Ground color black but heavily overlaid with light gray pollen which seems to be slightly tinged in some lights with ochraceous; above and beneath with rather abundant fine yellowish hairs, which are somewhat appressed on middle, longer and more erect on sides; hypopygium dark brown, somewhat shining.

Legs: Coxae light gray pollinose, hairs whitish or yellowish; femora except tip blackish, hairs pale; the tip of the femora, the tibiae wholly and the metatarsus except tip, brownish yellow; rest of tarsi blackish.

Wings: Membrane tinged with yellowish; veins also yellowish, darker towards apex; stigma elongate, pale brownish.

Female.—Length 5.5 to 8 mm. Similar to male except as follows: Front about two-thirds width of eye at narrowest point just above antennae, considerably wider on vertex; both front and vertex grayish yellow pollinose and with somewhat satiny appearance, with a number of short yellowish hairs; pollen of face slightly tinged with ochraceous; palpi and proboscis reddish yellow, the former darker on tip; pleura above distinctly tinged with ochraceous; halteres wholly yellowish; abdomen with hind border of segments above and below, but more broadly above, ochraceous; legs wholly brownish yellow except the four terminal segments of the tarsi which are dark brownish; wing veins on the whole paler than in the male.

Specimens Examined: 13; 6 males, 7 females.

WASHINGTON: 1 ♂, 1 ♀, [U. S. N. M., ex Aldrich]. 1 ♂, 1 ♀, Seattle, (O. B. Johnson), [U. of Washington].

OREGON: 2 ♂, ♀, Portland, June 6, 1915, (A. K. Fisher), [Biol. Surv.]. 1 ♂, Corvallis, June 11, 1925, (E. P. Van Duzee), [Calif. A. S.].

IDAHO: 2 ♀, Moscow Mountain, July 6, 8, 1911, (A. L. Melander), [one specimen retained for the C. U. Collection].

COLORADO: 1 ♂, 1 ♀, [U. S. N. M.]. 1 ♀, Long's Peak Inn, 9000 ft., July 12, 1926, (E. C. Van Dyke), [Calif. A. S.].²⁹

WISCONSIN: 1 ♀, [A. M. N. H., ex. Wheeler].

²⁹ Reported from Happy Hollow and Little Beaver and Clear Creek, by Johnson (1913: 10).

The female from Wisconsin may possibly be a small teneral specimen of *A. leptis* O. S. but I place it here provisionally at least. There is a suggestion of the mesonotum being somewhat vittate but otherwise it is undoubtedly *pollinosum*. The July 8 female from Moscow Mt. measures about 9 mm.; it is in perfect condition and apparently a typical *A. pollinosum*.

Subfamily RHAGIONINAE

Key to the Genera of the Subfamily Rhagioninae

1. Front tibiae without terminal spurs.....4
Front tibiae with one or two terminal spurs.....2
2. Antenna with a more or less thickened, segmented style.....10 9
Antenna with a slender, unsegmented arista, fourth posterior cell sometimes wanting..... **Dialysis** p. 56
3. Antennal style slender; wings gradually tapering towards base, without alulae; five posterior cells present..... **Vermileo** p. 70
Antennal style thick; wings broader at base, alulae present; only four posterior cells..... **Bolbomyia** p. 74
4. Discal cell wanting; only four posterior cells..... **Hilarimorpha** p. 75
Discal cell present; five posterior cells.....5
5. Third segment of antennae round, oval, or conical.....7
Third segment of antennae kidney shaped, with a dorsal or subdorsal arista...6
6. Hind tibiae with a single terminal spur; anal cell open; first antennal segment elongate and thickened..... **Symphoromyia** p. 77
Hind tibiae with two terminal spurs; anal cell closed; first antennal segment not elongate and thickened..... **Atherix** p. 81
7. Hind tibiae with two terminal spurs; anal cell usually open.... **Rhagio** p. 86
Hind tibiae with one terminal spur; anal cell closed.....8
8. Third antennal segment but little if ever longer than the second, onion-shaped or conical, and bearing a slender terminal arista which is distinctly longer than the three segments together..... **Chrysopilus** p. 129
Third antennal segment distinctly longer than the second, elongate, and not bearing a slender terminal bristle.....9
9. Third antennal segment with an almost central terminal style, subequal in length to the segment; the vein arising from the anal border of the discal cell almost always reaching the margin of the wing..... **Ptiolina** p. 173
Third antennal segment with the lower edge prolonged into an elongated, tapering style which is at least twice the length of the stouter more globular basal portion; the vein arising from the anal border of the discal cell almost always failing to reach the margin of the wing..... **Spania** p. 176

The genus *Mythicomyia* Coquillett has not been included in the above key. I have not studied these flies altho both Aldrich and Kertész in their Catalogs list the genus in the Rhagionidae. Williston's Manual figures the wing and antenna with the Bombyliidae. Some workers refer *Mythicomyia* to the Empididae.

DIALYSIS Walker

1850. *Dialysis* Walker, Ins. Saund., Dipt. I, p. 4.

1872. *Triptotricha* Loew, Berl. Ent. Zeits., XVI, p. 59

1886. *Agotomyia* Williston, Ent. Am., II, p. 106.

1886. *Agotomyia* Williston, Ent. Am., II, p. 106.

Elongate flies of large to medium size; eyes of the male contiguous, of the females separated by about the width of the ocellar tubercle and with the sides of the front nearly parallel; third antennal segment conical, noticeably smaller than the second and with a long, slender, terminal arista; tibial spurs 1:2:2 (except in *D. disparilis* Bergroth which should probably be placed in a new genus); four or five posterior cells present in the wing; anal cell and the fourth posterior cell, when complete, closed.

GENOTYPE:—*Stygia elongata* Say (as *dissimilis* Walker, new species).

There has long been confusion as to the exact generic differences between *Dialysis* Walk, and *Triptotricha* Lw. and several species have been erroneously placed, by authors other than those who described them, in that one of the two genera in which they did not belong. This confusion seems to have arisen chiefly through a statement of Townsend's (1891: 117-119) that Loew's three species of *Triptotricha* viz. *lauta*, *fasciventris*, and *discolor* all have two spurs on the front tibiae. This statement was referred to by Williston in a later paper (1895: 263-266) in which he says that the type of Loew's genus *Triptotricha* was shown by Townsend to possess two spurs on the front tibiae; and Williston has so defined *Triptotricha*. *Dialysis* has been defined by Williston as having a single spur on the front tibiae. Loew (1874: 381) states definitely, though not in his original diagnosis but under his description of *T. fasciventris*, that his genus *Triptotricha* possesses but one spur on the front tibiae and an examination of the type specimens of *lauta*, *fasciventris* and *discolor* bear out this statement. Townsend undoubtedly had not had an opportunity to study the type specimens when he said that

these species each had two spurs on the front tibiae. At the time Loew erected the genus *Triptotricha* Walker's *Dialysis* was known only from the type which was wrongly labelled, and with a query, *Xylophagus americanus*, Walker having forgotten, apparently to change the label. The original diagnosis of *Dialysis* makes no mention of the number of tibial spurs and as Walker referred it to the *Xylophagidae* Loew's mistake in creating a synonym was only natural. *Triptotricha* Lw. therefore equals *Dialysis* Walk., a synonymy which, however, had all along been recognized both by Osten Sacken (1883: 295) and by Bergroth (1889: 296) but which apparently has not been recognized by any of the leading workers since.

Key to Species of Dialysis

MALES

1. Front tibiae with two terminal spurs.....**disparilis** Berg.
Front tibiae with a single terminal spur.....2
2. Abdomen with a median row of elongate black spots, (sometimes wedge-shaped on basal or apical segments) which are usually fairly distinct from the dark band of varying intensity which often borders the base of each segment...3
Abdomen with the segments broadly banded basally with black, or with broad wedge-shaped black spots which reach the lateral borders at the base of the segments; no row of median spots distinguishable as such.....5
3. Mesonotum and pleura yellowish brown to dark brown; median spots on abdomen usually wedge-shaped on apical segments; five posterior cells present or the fourth posterior cell often incomplete or lacking entirely, leaving only four posterior cells; length 9-12 mm. (Eastern States)...**rufithorax** Say
Mesonotum and pleura blackish; five posterior cells present; length, 12-14 mm.; (Cal.)4
4. Median spots on abdomen usually not connected with lateral border of segments by a more or less darkened basal band; those on basal segments usually distinctly wedge-shaped; length, 12 mm.; mesonotum shining black; hairs of mesonotum and abdomen not quite as long or as dense as in the following species.....**lauta** Lw.
Median spots on abdomen more or less connected with lateral borders of segments by a darkened basal band; length, 14 mm.; mesonotum less black and shining; hairs of mesonotum and abdomen longer and somewhat denser than in foregoing species.....**discolor** Lw.
5. Abdominal segments each with a broad wedge-shaped black spot reaching lateral margins at the base but the apex usually not quite attaining the caudal border (Western States).....**aldrichi** Will.

- Abdominal segments each with a broad black basal band leaving the caudal half or sometimes only the caudal border narrowly yellowish (Eastern States) 6
6. Four posterior cells only, present; the wing membrane almost hyaline or slightly nearly uniformly tinged with brownish **elongata** Say
- Five posterior cells present; the wing membrane distinctly tinged with brownish at the apex and thru the middle **fasciventris** Lw.

FEMALES

1. Front tibiae with two terminal spurs **disparilis** Bergr.
Front tibiae with a single terminal spur 2
2. Abdomen with a median row of black spots which in no case attain the lateral border of the segments 3
Abdomen broadly banded basally with black or with a large triangular black spot on each segment which attains the lateral margin at the base of the segment 4
3. Median spots on abdomen rounded or elongate, never wedge-shaped, often small and sometimes very faint or lacking on some of the segments; mesonotum unmarked; fourth posterior cell often incomplete (Eastern States)
rufithorax Say
- Median spots on abdomen usually wedge-shaped on basal segments, apparently always present and well marked; mesonotum usually with a short black median line just in front of the scutellum; five posterior cells almost always present; (Cal.) **lauta** Lw.
4. Abdominal segments each with a broad triangular blackish spot, reaching the lateral margins at the base, the apex almost attaining the caudal margin; five posterior cells present (Idaho and Wash.) **aldrichi** Will.
Abdominal segments with markings more in the nature of broad basal bands which however are often somewhat produced caudad on the median line; four or five posterior cells present (Eastern States) 5
5. Four posterior cells only, present; wing membrane almost hyaline or only slightly tinged with brownish **elongata** Say
- Five posterior cells present; the wing membrane distinctly tinged with brownish at the apex and thru the middle **fasciventris** Lw.

Dialysis dispar Bigot, described from California from both sexes, has been omitted from the above table as I have been unable to recognize it.

Dialysis aldrichi Williston

1895. *Dialysis aldrichi* Williston, Kans. Univ. Quart., III, p. 265.

Yellowish brown, the thorax of the male black, of the female yellowish brown; each abdominal segment with a prominent black triangle which reaches the lateral border; legs with tarsi and the

tips of hind femora infuscated; wings slightly tinged with brownish yellow.

Male.—Length, 8.5 to 11 mm. Head: Frontal triangle and face blackish in ground color, entirely overlaid by greyish pollen; antennae brownish yellow, the third segment and the arista blackish; palpi and proboscis yellowish to brownish yellow, the antennae and palpi with a few pale hairs; the cheeks with long pale hairs.

Thorax: Mesonotum shining black, lateral border glistening whitish pollinose which is more distinct in certain lights; humeri yellowish with similar pollen; scutellum also shining, blackish, and together with the mesonotum densely clothed with rather long, somewhat appressed pale hairs; pleura shining dark brown to blackish, except for the usual broad glistening stripe of whitish pollen, bare except in spots for a few fine pale hairs, particularly on the metapleura; metanotum dark brownish to blackish, bare, subshining; halteres brownish yellow, knob more or less distinctly infuscated.

Abdomen: Brownish yellow, the first four segments each with a large black triangular spot which, except on the first, attains the lateral border and in all reaches or nearly reaches the posterior border, the remaining segments blackish with the posterior angles brownish yellow; the dorsum with fairly dense, rather long, somewhat appressed pale hairs, intermixed with a few black ones and longer on sides; venter brownish yellow with the base of each segment blackish.

Legs: Coxae brownish yellow, sometimes partly blackish especially the hind pair, and with numerous long pale hairs; femora brownish yellow, the hind pairs usually infuscated towards tip, especially above; front and middle tibiae brownish yellow except at tips which with the hind pair and the tarsi are dark brownish.

Wings: Membrane tinged with brownish; veins brown.

Female.—(Here described for the first time.) Length, 10.5 to 13 mm. Similar to the male except that the whole thorax is yellowish brown; hairs of the thorax and abdomen much shorter; the hind tibiae are somewhat paler; the fifth abdominal segment is nearly all blackish except the apical border and the remaining segments are wholly brownish yellow except the tips of the valves of the ovipositor which are brownish.

Allotype.—Female; Moscow, Idaho, June 6, 1907, in collection of J. M. Aldrich, U. S. National Museum.

Specimens Examined: 16; 9 males, 6 females, 1 sex unknown.

WASHINGTON: 1 ♂, Pullman, June 25, 1916; 1 ♀ July, [Melandar]; 1 ♂, [U. S. N. M.]; 1 ♂, [Cole]. 1 ♀, Medical Lake, July 14, 1920, (R. C. Shannon), [Shannon]. 1 ♀, Wawawai, (C. V. Piper), [U. S. N. M.].

OREGON: 1 ♂, Hood River, June 12, 1917, (F. R. Cole), [Cole].

CALIFORNIA: 1 ♂, Saquel Creek, Santa Cruz County, May 30, 1909, (E. C. Van Dyke), [U. of Cal.].

IDAHO: 2 ♂, 2 ♀, Craig's Mountain (J. M. Aldrich); 1 ♀, Moscow, June 6, 1907, (J. M. Aldrich), [U. S. N. M.; *allotype*]; 1 ♂, (J. M. Aldrich); 1 ♂, Potlach, June 20, 1907, (J. M. Aldrich); 1, Idaho Falls, (J. M. Aldrich) [all U. S. N. M.].

Dialysis discolor Loew.

1874. *Triptotricha discolor* Loew, Berl. Ent. Zeits., XVIII, p. 379.

In the Museum of Comparative Zoology at Cambridge, Mass. there is but one specimen under this species. It is labelled "S. Francisco. H. Edw. Type. Loew" and "discolor Lw." in Loew's handwriting. This type is a male, Loew therefore apparently being in error as to the sex of the specimen from which his original description was drawn up.

I have been unable to refer any additional material which I have examined to this species except Mr. Johnson's specimen from Berkeley, Calif. This agrees very well with the type. Several specimens identified by other workers in the past were quite clearly referable to other species upon examination.

The type is therefore somewhat briefly redescribed as follows; it seems to agree well with Loew's description:

Length, about 14 mm. Head: first two antennal segments almost blackish above, below tawny, clothed with short blackish hairs; the third segment somewhat paler.

Thorax: Mesonotum blackish, shining when viewed through the hairs, but thickly clothed with fairly long, pale hairs and with a line of yellowish tomentum on either side from the humeral calli to the wing base, humeral calli brownish yellow; halteres brownish yellow, knobs distinctly infuscated; pleura below and behind humeral calli blackish brown, shining.

Abdomen: Yellowish brown; first segment small and blackish; remaining segments except the last which is immaculate, each with a blackish triangular spot in the center, the apex nearly reaching the hind border; on the basal segments this spot almost reaches the lateral border but becomes narrow at the base on each successive segment; the basal or caudal border of each segment is clouded with blackish as an indistinct lateral extension of the central spot; hairs of abdomen comparatively long and fairly abundant, pale and black mixed; venter reddish.

Legs: Anterior femora and tibiae brownish yellow, the posterior dark brownish, paler towards the base of the femora; tarsi dark brownish.

Wings: Membrane more strongly tinged with brownish than in *D. lauta* for example, but slightly paler towards the center of most of the cells, darker along the costal border.

Specimens Examined: 3 males.

WASHINGTON: 1 ♂, Snoqualmie, July 15, 1892, [Univ. Wash.].

CALIFORNIA: 1 ♂, "S. Francisco," (Hy. Edwards), [M. C. Z.; *type*]. 1 ♂, Berkeley, May 15, 1915, (M. C. Duzee), [Johnson].

I have not had the opportunity to examine the specimens reported by Hine (1904: 90) from Wellington, British Columbia, and by Cole and Lovett (1921: 236) from Forest Grove, Corvallis and Mary's Peak, Oregon, but am inclined to believe they may refer to another species.

Dialysis discolor is a noticeably hairy species in contrast to *lauta* and *fasciventris* to which it would seem to be most closely related.

Dialysis dispar Bigot

1879. *Dialysis dispar* Bigot, Ann. Soc. Ent. Fr. (ser. 5) IX, p. 197.

I have been unable to refer any specimens to this species. It apparently has not been recognized since it was described. A translation of the original diagnosis follows:

"♂, ♀. Length, ♂ 11 mm., ♀ 14 mm.

"♂, Antennae, palpi and proboscis tawny, hairs black, face black; thorax and scutellum shining fuscous, humeri and sides tawny, pleura on each side with a broad somewhat whitish longitudinal stripe; abdomen shining tawny, first segment with a black basal spot, segments two, three and four narrowly at the base, the fifth broadly fuscous, sixth and seventh with an abbreviated longitudinal basal dash, fuscous black; halteres tawny; feet tawny; tarsi black; wings brownish yellow.

"♀. Similar, except as follows: face cinereous, thorax and scutellum reddish tawny, [abdominal] segments at base more darkened; posterior tarsi chestnut.

"Antennae, palpi and proboscis tawny; hairs black; face black; thorax, scutellum of a shining blackish brown, humeri and lateral borders tawny, a broad whitish band on each side on the pleura; abdomen of a shining tawny, first segment with a short black longitudinal basal stripe, those of the second, third and fourth brownish, base of the fifth broadly shaded with the same shade, but darker, sinuate posteriorly; the sixth similar except that the band is prolonged a little into a point on the middle of the segments; the seventh with a medium longitudinal partial band of the same color; venter tawny, broadly brownish at the top; halteres tawny, tarsi blackish, the posterior ones more darkened, pulvilli gray; wings a clear yellowish brown.

"♀. Similar, except as follows: front brownish, face gray; thorax a shining tawny; humeri and posterior angles yellowish; abdomen a reddish tawny, a little brownish at the base of segments, sides narrowly bordered with brown; posterior tarsi a pale brownish; tip of femora and base of posterior tibiae brownish.

"California. — my collection."

Dialysis disparilis Bergroth

1889. *Dialysis disparilis* Bergroth, Wien. Ent. Zeitg., VIII, p. 296.

1895. *Triptotricha disparilis* Williston, Kans. Univ. Quart., III, p. 265.

Male: Whole thorax shining or subshining black, abdomen tawny with broad black basal bands which are sometimes produced

caudad on the median line or further expanded into broad wedge-shaped triangles on some of the segments; legs brownish yellow except tarsi, hind tibiae and tip of hind femora, which are usually blackish; wings often strongly tinged with brownish or brownish yellow. Female: Almost wholly yellowish brown; abdominal segments sometimes obscurely bordered at base with blackish; legs often entirely brownish yellow; otherwise similar to male.

Male.—Length, 11 to 15 mm. Head: Antennae with first two segments yellowish brown to almost black, with fine pale hairs, the third segment and the arista blackish; proboscis and palpi yellowish brown, the latter with a number of fairly long whitish hairs; hairs of cheeks long and pale.

Thorax: Mesonotum, scutellum and metanotum blackish or slightly tinged with brownish, the former two with fairly long rather abundant pale hairs directed caudad on mesonotum and more erect on scutellum; extreme lateral border of mesonotum from humeri to base of wings whitish pubescent; pleura almost black except for the usual silvery strip and the mesopleura polished as usual; mostly bare except for a few pale hairs on the pteropleura and metapleura; halteres with stalk brownish yellow, knobs dark brown.

Abdomen: Brownish yellow to yellowish brown banded with dark brownish to blackish variably somewhat as follows: the first segment almost wholly blackish except caudo-lateral angles, the bands on segments two to five or six usually produced caudad on median line or, especially on five to seven often forming a broad wedge-shaped spot with the apex caudad; pile rather short, mostly black, not very dense on disc but a little longer and more abundant and pale on sides.

Legs: Coxae dark brownish to almost entirely blackish with fairly long pale hairs; front and middle trochanters, femora, tibiae and metatarsi except tip, a dark yellow to brownish yellow, the apex of the tibiae and often the tip of the metatarsi and the remainder of the tarsi dark brownish to blackish; the hind legs yellowish brown, the femora becoming blackish towards the apex especially on the upper edge, the tibiae mostly blackish except the metatarsi which are often yellowish brown except the tip.

Wings: Usually strongly tinged with dark brown, especially through base of discal cell and bordering most of the veins; stigma elongate, narrow and almost black.

Female.—Length, 13 to 17 mm. Similar to male except as follows: Front overlaid with velvety light brown to gray pollen; third antennal segment often brownish yellow; thorax wholly brownish yellow, never blackish but sometimes somewhat blackened on mesonotum; hairs shorter than in male; abdomen brownish, marked somewhat as in male but much more indistinctly, in fact sometimes markings very obscure or almost wanting entirely; legs almost wholly brownish yellow or darkened somewhat as in male but much less distinctly so; wings with more of a yellowish tinge.

Specimens Examined: About 59 males and females.

BRITISH COLUMBIA: 2 ♂, Agassig, August 1915, (R. C. Treherne), [U. S. N. M. and C. N. M.]; 1 ♂, 1 ♀, June 19, 1914, (R. C. Crystal); 1 ♀, Victoria, (A. H. Hanham); 1 ♀, Mount Cheam, (R. C. Treherne), [all C. N. M.]. 1 ♀, Saemich District, June 12, 1917, (W. Downes), [R. S. Sherman]. 2 ♀, White Rock, July 1911, [R. S. Sherman]. 1 ♀, Biological Station, Nanaimo, June 23, 1920, (E. P. Van Duzee), [Cal. A. S.].

WASHINGTON: 10 ♂, 6 ♀, "Washington Terr." [C. U.]. 1 ♂, "W. Wash. Ty." (H. K. Morrison), [A. M. N. H.]. 1 ♂, 1 ♀, Seattle, [Leonard]; 1 ♂, 1 ♀, (O. B. Johnson), [Univ. Wash.]. 1 ♂, Tenino, [U. S. N. M.]. 1 ♂, Tacoma, July 13, 1920, (E. C. Van Dyke), [Cal. A. S.]. 2 ♀, Northbend, King County, July 8 and 10, 1920, (E. C. Van Dyke), [Cal. A. S.]; 1 ♀, July 9, (Kincaid), [U. of Ill.]. 1 ♂, Orcus Island., July 14-30, 1909, (W. M. Mann), [Mann].

OREGON: 1 ♂, 1 ♀, Forest Grove, June 5, 1918, (F. R. Cole), [Cole]. 1 ♂, Mary's Peak, (F. R. Cole), [Cole]. 1 ♀, "Ore." (Cordley), [U. S. N. M.]. 1 ♂, Corvallis, May 18, 1897, [U. S. N. M.]. 1 ♀, Manzanita, July 3, 1920, (L. P. Rockwood), [Shannon]. 1 ♀, Waldport, July 4, 1925, [Brook. Mus.].

CALIFORNIA: 3 ♀, Sierra Nevada, [A. M. N. H.]. 1 ♀, Keddie, Plumas County, July 8, 1918, (F. M. Jones), [A. N. S. P.]. 5 ♂, 8 ♀, Carrville, June 4-27, 1913, (E. C. Van Dyke), [U. of Cal.].

This species may be at once distinguished from all other members of the genus by the presence of two terminal spurs on the front tibiae.

Dialysis elongata Say (Pl. II, fig. 9)

- 1823. *Stygia elongata* Say, Jour. Acad. Nat. Sci. Phila., III, p. 41.
- 1828. *Anthrax elongata* Wiedemann, Aussereurop, Zweifl. Ins., I, p. 315.
- 1828. *Lomatia elongata* Wiedemann, Aussereurop, Zweifl. Ins., I, p. 561.
- 1848. *Xylophagus americanus* Walker, List Dip. Brit. Mus., I, p. 128.
- 1850. *Dialysis dissimilis* Walker, Insecta Saundersiana Dip., I, p. 4.
- 1883. *Triptotricha dissimilis* Osten Sacken, Berl. Ent. Zeit., xxvii, p. 295.
- 1886. *Agotomyia elongata* Williston, Ent. Am., II, p. 106.
- 1895. *Agotomyia elongata* Williston, Kans. Univ. Quart., III, p. 265.
- 1895. *Dialysis elongata* Williston, Kans. Univ. Quart., III, p. 265.

Mesonotum shining blackish; abdomen almost black, segments narrowly bordered behind with brownish yellow; legs yellowish, hind femora towards tip, hind tibiae somewhat, and all tarsi, blackish; wings almost hyaline or slightly tinged with brownish, especially towards apex, only four posterior cells present.

Male.—Length, 7.5 to 9.5 mm. Head: As usual frontal triangle and face black, overlaid with light gray or almost whitish pollen; proboscis and palpi yellowish and with a few fine whitish hairs; antennae with first two segments pale yellowish and with fine pale hairs, the third segment and arista dark brownish to blackish; cheeks with rather long whitish hairs.

Thorax: Mesonotum shining blackish and with fine, pale, somewhat appressed, fairly abundant hairs; humeri yellowish; scutellum concolorous with mesonotum, pile more erect and a little longer; humeri with the usual silvery white stripe, the mesopleura and lower half of sternopleura polished dark brown, the remainder of the pleura more of a yellowish brown as in also the metanotum; a few pale hairs on the pteropleura and metapleura; halteres with the stalk brownish yellow and the knobs infuscated.

Abdomen: Blackish, subshining, segments one to three or four with a narrowly brownish yellow caudal border usually expanding on sides; segments four and five often merely with only hind outer angles yellowish; hairs above fairly numerous, pale, intermixed with some blackish ones on disk, longer and wholly pale on sides.

Legs: Coxae yellowish white with fine long white hairs; front and middle femora and tibiae yellowish, their tarsi blackish; hind legs brownish yellow, except tip of femora, the tibiae wholly and the apex of the metatarsus and remainder of tarsi which are black.

Wings: Almost clear to somewhat tinged with brownish; a slight cloud at origin of radial sector; the stigma dark brown, narrow, elongate; veins dark brownish; only four posterior cells, sometimes a slight angle from the discal cell and in one or two specimens a short stump but in no specimens I have seen is an additional posterior cell present.

Female.—Length, 7.5 to 11 mm. Head: Similar to male except as follows: front as usual light gray to silvery pollinose; thorax wholly brownish yellow except for silvery stripe on pleura; abdomen brownish yellow with basal half or two thirds of segments 1–5 dark brownish to blackish; sometimes only the extreme caudal border of segments 4 and 5 are pale and sometimes the following segments are wholly or nearly all blackish; the blackish bands are usually produced caudad on the median line nearly to the caudal border of the segment.

Specimens Examined: About 64 males and females.

QUEBEC: 1 ♀, Montreal, July 29, 1919, (Ouellet), [Ouellet].

MAINE: 1 ♂, 1 ♀, Upper Gloucester, July 23, 1908, [Me. Agr. Exp. Sta. Coll.; Lot 1614 sub 8].

NEW HAMPSHIRE: 1 ♀, Squam Lake, August 3, 1901, (G. M. Allen), [B. S. N. H.].

MASSACHUSETTS: 2 ♂, Cohasset, Aug. 1, 10, 1905, (Owen Bryant); 2 ♀, Aug. 12, 1905; 2 ♂, Sharon, August 3 and 9, 1905; 3 ♀, Aug. 9, 1909, (C. W. Johnson), [all B. S. N. H.]. 1 ♀, Riverside, Aug. 16; 1 ♂, August 2, [B. S. N. H.]. 1 ♂, Manchester, [A. M. N. H.]. 1 ♂, Tynesboro, [Leonard, ex Blanchard].

CONNECTICUT: 1 ♂, Brookfield, July 27, [B. S. N. H.]. 1 ♀, Stonington, Aug. 6, 1914, (I. W. Davis), [Conn. Agr. Exp. Sta.].

RHODE ISLAND: 1 ♂, Kingston, July 29, 1905; 1 ♂, 1 ♀, Aug. 18–26, 1907, [R. I. Agr. Col.].

NEW YORK: 1 ♂, East Aurora, July 17, 1910, (M. C. Van Duzee), [Van Duzee]. 1 ♀, Olean, Aug. 5, 1917, (M. C. Van Duzee), [Van Duzee]. 1 ♂, White Plains, Aug. 7, (J. R. de la Torre Bueno), [Prof. Bezzi]. 2 ♀, "Staten Island," July 12 and Richmond Valley, Staten Island; 2 ♀, July 8, 1918, (W. T. Davis), [Davis]. 1 ♂,

Fort Wadsworth, July 17, 1917; 1 ♀, July 22, 1918; 2 ♂, 5 ♀, Richmond, July 26, 1920; 1 ♂, 4 ♀, July 27, 1920, (all E. J. Burns), [all Burns]. 2 ♂, Flatbush, Aug. 2, 1895; 1 ♀, Aug. 11, 1893; 1 ♀, July 31, 1890, (Zabriskie), [A. M. N. H.]. 1 ♂, Maspeth, Aug. 7, 1909, (C. E. Olsen), [A. M. N. H.].

NEW JERSEY: 1 ♂, 1 ♀, Great Notch, July, [A. M. N. H.]. 1 ♀, Hopatcong, July 5, 1908, (W. T. Davis), [Davis]. 1 ♂, Hemlock Falls, July, [A. N. S. P., ex W. G. Dietz]. Orange Mountains, 1 ♂, July (Weidt), [Pa. Dept. Agr., ex. Daecke]. 1 ♂, Elizabeth, Aug. 1, 1909, [A. M. N. H., ex I. Matausch].

PENNSYLVANIA: 3 ♀, Germantown, June 23, July 20, [A. N. S. P.]. 2 ♂, 3 ♀, Glenside, June 24, July 5, [A. N. S. P.]. 1 ♂, Montgomery County, June 26, 1896, (C. W. Johnson), [Leonard]. 1 ♀, June 30, [A. N. S. P.]. 1 ♂, "Pennsylvania," [A. M. N. H.].

NORTH CAROLINA: 1 ♀, Black Mountains, July 1-6, 1912; 1 ♀, Valley of Black Mountains, July 11, 1906, (Beutenmüller), [Leonard]; 1 ♂, 1 ♀, June, and 1 ♀, June-July, [A. M. N. H.]. 1 ♀, Lake Toxaway, (A. T. Slosson), [A. M. N. H.].

GEORGIA: 1 ♂, Rabun Bald, 4000-4800 ft., Aug. 21, 1913, [C. U.].

This species is very similar to *fasciventris* Loew from which, however, it can usually be distinguished by the presence of but four posterior cells and the much less distinct, or entirely absent, clouding at the tip of the wing and the clouding across the wing at the base of the discal cell.

Dialysis fasciventris Loew.

1874. *Triptotricha fasciventris* Loew, Berl. Ent. Zeits., XVIII, p. 380.

1897. *Dialysis fasciventris* Johnson, Ent. News, VIII, p. 118.

Brownish yellow (mesonotum in male almost blackish); abdomen broadly banded with blackish; legs yellowish to brownish yellow with tip of front and middle tibiae and the tarsi wholly dark brownish to blackish, hind legs with tip of femora, entire tibiae and tarsi except most of metatarsus blackish or brownish; wings strongly tinged with brownish, more pronounced towards apex and on a band across wing through base of discal cell.

Male.—Length, 8 to 9.5 mm. Head: Frontal triangle and face and occiput black overlaid with silvery white pubescence; antennae brownish yellow, third segment and arista blackish, first two segments with a few pale hairs; proboscis and palpi brownish yellow cheeks with fairly long pale hairs.

Thorax: Mesonotum scutellum and metanotum dark brownish shining, the two former with fine, somewhat appressed, pale hairs, humeri brownish yellow; pleura with the usual silvery white pubescent stripe, the mesopleura and lower half of sternopleura almost black and polished, remainder of pleura yellowish brown, subshining the metapleura and metanotum with fine pale hairs; halteres with stalk brownish yellow, knobs blackish.

Abdomen: Subshining, brownish yellow, the segments broadly banded basally with blackish, often only a very narrow apical paler band present especially on terminal segments; the dorsum with prominent hairs, pale and black intermixed but wholly pale and longer on sides.

Legs: Coxae yellowish, with fairly long pale hairs; front and middle femora more brownish than coxae, the hind pair tinged with blackish, especially at the tip; front and middle tibiae usually darkened toward tip and the tarsi wholly; hind tibiae usually wholly, and the tarsi except most of the metatarsus, blackish.

Wings: Membrane tinged with brownish more distinctly so towards apex and on a band across wing through base of discal cell.

Female.—Length, 10 to 11 mm. Similar to male except as follows: Front colorous with face; third antennal segment little if any darkened; mesonotum and scutellum brownish yellow, hairs shorter, pleura somewhat paler on the whole; abdomen with the bands usually occupying not more than the basal third or half of each segment, hair somewhat shorter; legs as in male but markings brownish rather than blackish.

Types.—The Museum of Comparative Zoology at Cambridge, Mass. has three females. Two of these are each labelled "type, fasciventris" and "Penns. coll. by Auxer" in Loew's handwriting. One is about 10 mm. in length, the other about 15 mm. The third specimen is labelled "Ill." and is 12 to 13 mm. in length. All agreed fairly well with Loew's original description.

Specimens Examined: About 32 males and females.

PENNSYLVANIA: 1 ♂, 1 ♀, Camphill, June 7, 1912, (A. B. Champlain), [Walton]; 2 ♂, 4 ♀, June 7, 1912, (E. Daecke), [Pa. Dept. Agr.]. 1 ♂, Allegheny, June 3, 1889; 4 ♀, July 2-9, 1891, [U. S. N. M.]. 2 ♂, Eberley's Mills, June 19, 1909, (Daecke), [Pa. Dept. Agr.]. 1 ♂, Harrisburg, June 12, (W. R. Walton), [U. S. N. M.]. 1 ♀, Pittsburg, [Pa. Dept. Agr.]. 1 ♀, Montgomery County, July 30, [A. N. S. P.]. 1 ♀, New Cumberland, June 19, (W. R. Walton), [Walton].

MARYLAND: 1 ♀, Plummer's Island, June 19, 1913, (R. C. Shannon), [U. S. N. M.]. 1 ♂, Camp Meade, June 16, 1918, (R. C. Shannon), [Shannon].

VIRGINIA: 1 ♂, Bluemont, June 13, 1916, (J. Knull), [U. S. N. M., Div. For. Ins.]. 1 ♀, Dead Run, June 23, (N. Banks), [Leonard]; 1 ♀, June 30, 1916, (R. C. Shannon), [Shannon].

NORTH CAROLINA: 1 ♂, 1 ♀, "N. Car." [U. S. N. M.]. 1 ♂, 1 ♀, Cranberry, Mitchell County, June 10, 3250 ft. (H. W. Wenzel).

OHIO: 1 ♀, Kent, Nov. 1913, (G. Wendelke).

INDIANA: 1 ♂, Lafayette, July 3, (J. M. Aldrich), [U. S. N. M.].

ILLINOIS: 1 ♂, Pulaski, May 24, 1908, [U. of Ill.]. 1 ♂, Parker, June 4, 1913, [U. of Ill.]. 1 ♀, "Ill." [M. C. Z.].

Dialysis lauta Loew.

1872. *Triptotricha lauta* Loew, Berl. Ent. Zeits., XVI, p. 59.

Brownish yellow (whole thorax and coxae shining black in male); abdomen with a medium row of black spots which are usually wedge-shaped on basal segments; hind legs of male somewhat darkened; wings tinged with brownish.

Male.—(Here described for the first time.) Length, 12 mm. Head: Frontal triangle and face black in ground color, gray pollinose, antennae brownish yellow, the first two segments with a few short dark hairs, the third segment and the arista black; proboscis and palpi brownish yellow, the former darkened towards the tip and with a few pale hairs; the pile of the cheeks long, whitish and fairly dense.

Thorax: Mesonotum, scutellum, metanotum and pleura shining black except for the usual whitish pollinose stripe on pleura, a similar narrow pollinose stripe from humeri to base of wings on extreme lateral border of mesonotum, and a brownish yellow tinge at the junction of metapleura with metanotum; humeri brownish yellow; mesonotum with fairly dense and long somewhat appressed pale hairs; pile of scutellum similar but more erect; pleura mostly bare except for the sparse pale hairs chiefly on propleura, at base of wings and on metapleura; halteres brownish yellow, knobs almost black.

Abdomen: Brownish yellow, segments one to seven each with a blackish median spot, broadly triangular on the first and second and elongate on the others, those on the first and fifth attaining the posterior border and the extreme lateral edge of all slightly edged with blackish; pile fairly abundant, somewhat appressed, black, longer, more erect and pale on sides.

Legs: Coxae except extreme tip blackish, whitish pollinose in certain lights and with rather long pale hairs; tip of coxae the trochanters and tibiae brownish yellow; tip of fore and middle tibiae, the apical half on upper edge of hind femora, the hind tibiae almost wholly, and all the tarsi, blackish.

Wings: Membrane strongly tinged with brownish, especially towards tip on costal border; veins dark brown.

Allotype.—Female; Berkeley, California, May 8, 1915, collected by M. C. Van Duzee in whose collection it is.

Five other males, all from California agree fairly well with the allotype. The first antennal segment may be blackish, however, especially on the tibiae; there is also a tendency in one or two of the specimens for the abdominal spots to be extended basally, on the basal segments, to the lateral border. I believe these characters, however, are merely variations within the species.

Female.—Length, 13 to 15 mm. Similar to male except as follows: front light grey pollinose; thorax and legs wholly brownish yellow except the last few tarsal segments which are sometimes darkened and a short medium black dash often present on mesonotum just cephalad of scutellum; abdominal spots on first five seg-

ments only, and in the specimens I have seen, never connected with the lateral border at base of the segments; mesonotal and abdominal hairs shorter.

Specimens Examined: 18: 6 males, 11 females.

CALIFORNIA: 1 ♂, Berkeley, May 8, 1915, (M. C. Van Duzee), [Van Duzee; *allotype*]. 1 ♀, Berkeley, May 25, 1915, (M. C. Van Duzee), [Johnson]; 1 ♀, May 20, 1907, [A. N. S. P.]. 1 ♂, Muir Woods, Marin County, May 19, 1915, (M. C. Van Duzee), [Van Duzee]. 3 ♂, 3 ♀, Sonoma County, [Davis]. 1 ♂, the hills back of Oakland, May 8, 1910, (E. C. Van Dyke), [U. of Cal.]. 3 ♀, Sobre Vista, May 19, 1910, (J. A. Kusche), [U. of Cal.]. 1 ♀, Lagunitas, Marin County, July 5, 1909, (E. C. Van Dyke), [U. of Cal.]. 2 ♀, Lagunitas, (Hy. Edwards), [A. M. N. H.]. 1 ♂, Coyote Creek, Tulare County, July 26, 1915, teneral?, abdomen immaculate.

Dialysis rufithorax Say (Pl. I. fig. 1, Pl. II. fig. 15).

1823. *Leptis rufithorax* Say. Jour. Acad. Nat. Sci. Phila., III, p. 365.

1874. *Triptotricha rufithorax* Loew, Berl. Ent. Zeits., XXVIII, p. 382.

1895. *Dialysis rufithorax* Williston, Kans. Univ. Quart., III, p. 265.

Brownish yellow mesonotum of male usually somewhat darker, abdomen with a row of elongate medium black spots (sometimes almost wanting in female) which in male are usually larger, better defined, and distinct from a dark basal band which is often present on most of the segments; legs yellowish to brownish, the tarsi, and tip of hind tibiae usually blackened; wings slightly tinged with brownish, a little darker along costal border and toward tip.

Male.—Length, 9 to 10 mm. Head: Frontal triangle and face blackish, light gray pollinose; palpi yellowish often brownish towards tip or almost wholly brownish and with a few pale hairs; proboscis with stalk yellowish, whole apical flattened part blackish above; antennae with third segment and arista blackish, first two segments yellowish brown or often more or less darkened, hairs on cheeks long and pale.

Thorax: Mesonotum and scutellum yellowish, sometimes obscurely darkened in places, shining, with fine short pale hairs, humeri somewhat paler, pleura for the most part bare except for some pale hairs on the metapleura, nearly concolorous with the mesonotum except for the usual silvery white pollinose stripe and a large dark brown polished spot on the mesopleura; metanotum bare, halteres brownish yellow, knob dark brown.

Abdomen: Brownish yellow, segments one to four with a medium dark brown to blackish elongate spot which is often wedge-shaped, however, on the first segment; the remaining segments are sometimes almost wholly blackish except the narrow posterior border, the posterior lateral angles only brownish yellow; sometimes all or part of the first four segments have a darkened basal band which, however, is usually quite distinct from the median spot; pile of dorsum pale, shorter and somewhat appressed on disc, longer and more erect on sides.

Legs: Coxae yellowish, with fairly long rather numerous pale hairs; femora a little more brownish than the coxae, the hind pair still darker and distinctly black-

ened towards tip above; base of fore and middle tibiae brownish yellow, the remainder blackened especially toward tip; the hind tibiae and the tarsi blackish except the hind metatarsi which are brownish yellow.

Wings: Distinctly tinged with brownish, a little more distinctly along costal border, and toward tip, the stigma narrow, dark brown, elongate; veins dark brownish yellow.

Female.—Length, 9 to 12.5 mm. Similar to male except as follows: Front, as usual blackish overlaid with almost white pollen; polished spot on mesopleura concolorous with rest of pleura; abdomen with a small rounded or elongate median blackish spot usually on segments one to four only, sometimes on first two segments, or they may be very faint or almost lacking entirely leaving the abdomen practically immaculate brownish yellow; hairs on thorax and abdomen as usual shorter than on male; wings not quite so strongly tinged with brown although the brownish tinge is quite distinct along the costal border and towards tip; also there is often a distinct brownish tinge at the origin of the radical sector.

Specimens Examined: About 102 males and females.

NEW JERSEY: 1 ♀, Trenton, July 3, 1907; 1 ♀, July 4, 1910, (Harbeck), [U. S. N. M.]; 1 ♂, 2 ♀, July 4, [A. N. S. P.]. 2 ♀, Jamesburg, July 2, [Davis]. 1 ♂, 2 ♀, "N. J." [A. N. S. P.].

PENNSYLVANIA: 1 ♀, Germantown? June 18, 1904, [A. M. N. H.]; 1 ♂, June 24, 1904; 1 ♀, June 18, 1904, (Harbeck), [U. S. N. M.]; 1 ♂, 1 ♀, June 18, 26, [A. N. S. P.]. 2 ♀, Highspire, June 14-20, (W. S. Fisher), [Walton]; 1 ♀, July 2, 1909, (W. S. Fisher), [Pa. Dept. Agr.]. 3 ♀, Harrisburg, June 18, (W. S. Fisher); June 26, (W. R. Walton), [Walton]. 1 ♀, Heckton Mills, June 16, 1911, [Pa. Dept. Agr. Coll.]. 3 ♀, June 21, [Walton]. 1 ♂, Progress, [Walton]. 1 ♀, Montgomery County, June 16, 1895, [U. of Ill.]; 2 ♂, June 22, [A. N. S. P.]. 1, Philadelphia, June 15, 1894, [Leonard]. 1 ♀, Dauphine, June 16, 1917, [Pa. Dept. Agr.]. 1 ♂, Hummelstown, July 22, 1917, (J. N. Knull), [Pa. Dept. Agr.]. 1 ♀, Montgomery County, June 16, 1895; 1 ♀, Castle Rock, Delaware County, June 14, [A. N. S. P.]. 1 ♂, Glenside, Montgomery County, June 8, 1903. 1 ♂, June 15, 1895, [U. of Ill.].

MARYLAND: 1 ♀, Beltsville, June 8, 1916, (W. R. Walton), [Walton]. 1 ♀, Cabin John Bridge, June 14, 1913, (R. C. Shannon); 1 ♀, Cabin John, July 12, (R. M. Fouts); 1 ♀, Plummer's Island, June 18, 1914; 2 ♀, June 5, 1903, (W. V. Warner, and D. H. Clemons); 1 ♂, Marlboro, June 19, 1916, (R. C. Shannon); 1 ♀, Jackson's Island, June 15, 1911, (H. S. Barber), [all U. S. N. M.]. 1 ♀, Camp Meade, May-June, 1919, (R. C. Shannon), [Shannon]. 3 ♀, June 26, 1912, [Md. Agr. Col.]. 1 ♀, Montgomery County, June 20, 1911, (W. T. Davis), [Davis].

DISTRICT OF COLUMBIA: 1 ♂, "D. C.," [M. C. Z.; Loew det.]. 1 ♂, Washington, June 8, 1910; 1 ♀, June 15, 1910, (W. T. Davis), [Davis]; 1 ♂, [U. S. N. M.]; 1 ♀, June 11, 1899, (F. C. Pratt), [U. S. N. M.]; 1 ♀, June 10, 1905, (D. H. Clemmons), [U. S. N. M.]. 1 ♀, Rock Creek, June 9, 1917, (C. H. T. Townsend), [U. S. N. M.].

VIRGINIA: 1 ♂, 1 ♀, Glencarlyn to mouth of 4-mile-Run, June 11, 1916, (W. L. McAtee), [Biol. Surv.]; 1 ♂, 2 ♀, May 31, (Rohwer), [U. S. N. M.]; 1 ♂, May 30, (N. Banks), [N. Y. S. M.]; 2 ♀, June 6, 1916 and 2 ♀, June 5, 1918, (C. T. Greene),

[U. S. N. M.]; 1 ♂, June 14, (N. Banks), [Banks]; 1 ♂, June 17, (N. Banks), [W. A. Mann]. 1 ♀, Dead Run, July 4, 1916, (H. L. Viereck), [Biol. Surv.]; 1 ♀, June 22, 1915, (R. C. Shannon), [Shannon]. 1 ♂, Falls Church, May 29, (N. Banks), [U. S. N. M.]; 3 ♀, July 3, 1916, (J. N. Knull), [U. S. N. M.]; 1 ♀, (C. T. Greene), [U. S. N. M.]; 1 ♀, June 6, (N. Banks), [N. Y. S. M.]; 1 ♀, June 19, 1916, (J. N. Knull), [Shannon]; 1 ♀, May 21, (N. Banks), [Banks]; 1 ♂, June 5, 1916, (C. T. Greene), [U. S. N. M.]; 2 ♀, June 13, 1913, (Aug. Busck), [U. S. N. M.]. 1 ♂, Chain Bridge, June 14, (S. A. Rohwer), [U. S. N. M.]. 1 ♀, Buckingham County, June 20, 1919, (W. T. Davis), [Davis]. 2 ♀, Great Falls, July 5, 1920, (Bridwell), [U. S. N. M.]; 1 ♀, June 29, 1915; 1 ♀, June 28, 1917, (C. T. Greene), [U. S. N. M.]; 2 ♀, June 12, (N. Banks), [Mann]; 1 ♂, June 16, 1910, (W. T. Davis), [Davis]; 1 ♂, June 20, 1916, (C. T. Greene), [U. S. N. M.]. 1 ♀, Hyson, June 8, 1913, (Wm. Middleton), [U. S. N. M.].

NORTH CAROLINA: 1 ♂, Raleigh, May 26, 1921; 1 ♀, May 28, 1921, (C. S. Brimley), [N. Car. Dept. Agr.]. 3 ♂, 3 ♀, "N. Car.," [U. S. N. M.]. 1 ♀, Swannanoa, June 22, 1917, (R. W. Leiby), [N. Car. Dept. Agr.].

GEORGIA: 1 ♀, Clayton, 2000-2700 ft., June, 1909, (C. W. Johnson), [Davis]. 1 ♀, "Ga." (H. K. Morrison), [U. S. N. M.].

FLORIDA: 1 ♀, "Florida," [U. S. N. M.].

KENTUCKY: 1 ♂, 6 ♀, "Ky.," (Osten Sacken), [M. C. Z.].

ILLINOIS: 2 ♀, Parker, [U. of Ill.].

MISSOURI: 2 ♀, Cadet, (J. G. Barlow), [U. S. N. M.].

In addition to the above are two females in the M. C. Z. Coll. without locality label.

VERMILEO Macquart

1775. *Rhagio* Fabricius Syst. Ent., p. 761. p. pt.

1834. *Vermileo* Macquart, 1, p. 428.

1840. *Psammorycter* Blanchard, Hist. Nat. d. Ins., III, p. 603.

1852. *Apogon* Perris, Ann. Soc. Linn. Lyon, V, p. 198.

Rather small flies having the general appearance of *Leptogaster* of the Asilidae; abdomen elongate, the intersegmental membranes well developed so that the segments are distinctly separated; antennae with third segment somewhat acuminate and bearing a slender three-segmented arista which is about the length, or a little longer than the rest of the antenna; legs slender, the hind pair nearly twice the length of the other two pairs; tibial spurs 1 : 2 : 2, well developed wings narrow, elongate, almost petiolate at the base, the anal cell narrow, no posterior lobe developed, the fourth posterior and anal cells narrowed at the border and the anal vein with a distinct sinuosity near the base.

GENOTYPE: *Vermileo vermileo* DeGeer.

Key to Species of Vermileo

- A more slender and smaller species somewhat paler in general appearance; wings almost hyaline; total length about 5 mm. (Nev. and N. Mex.). **.opacus** Coq.
A more robust, darker and slightly larger looking species; wings distinctly tinged with grayish or brownish; total length about 6 mm. (Cal.). **.comstocki** Wheeler

Vermileo comstocki Wheeler

1918. *Vermileo comstocki* Wheeler, Proc. N. Eng. Zool. Club, vi, p. 83.

Bearing a strong resemblance in both general shape of body and of wings and from the length of the hind legs to *Leptogaster* of the Asilidae. Head grayish pollinose; antennae with a long segmented arista; mesonotum brownish in ground color, gray pollinose, with three broad dark stripes, the middle one narrowly divided; abdomen appearing to have alternating shining blackish and dull paler bands, legs brownish yellow, long and slender especially the hind pair; wings elongate, tapering towards base.

Female.—Length, 5.5 mm. Head: Viewed from the front nearly twice as broad as high, in profile as long as high; front just above antennae about one-sixth the total width of the head, widening considerably above; face about the width of the front, slightly convex; both front and face blackish in ground color, densely light gray pollinose; palpi blackish; proboscis brownish yellow; occiput grayish pollinose also and with black hairs, which become paler on the cheeks; antennae with first segment somewhat longer than broad, the second shorter and somewhat wider, subglobose, the third larger somewhat pointed, the arista arising from a point which is situated above the middle the segment being distinctly more swollen below than above it; the arista somewhat longer than the rest of the antennae, slender and apparently three-segmented, the first very short, the second about twice as long and the third slightly more than twice as long as the other two taken together; first segment of the antennae brownish, the remainder blackish.

Thorax: Mesonotum dark brown, gray pollinose with three broad, darker stripes, the middle one divided, the lateral ones broader and not attaining the scutellum; scutellum brownish; metanotum well developed, pollinose on upper half, polished black on the lower; pleura brownish with the lower half of the sterno- and pteropleura, and the mesopleura wholly blackish, all sclerites thinly gray pollinose; halteres yellowish, the knob blackish.

Abdomen: Almost as broad as the thorax and nearly three times as long, with nine distinct segments; the tergites transversely convex near their posterior margins, shining dark brown to black, the intersegmented membranes well developed so that the tergites are distinctly separated from one another; membranes lighter in color and somewhat pollinose.

Legs: Coxae more or less yellowish, thinly light gray pollinose and with a few pale hairs; remainder of the legs brownish yellow, the tarsi somewhat infuscated; front

and middle legs rather short and comparatively slender, the hind pair almost twice as long and somewhat stouter.

Wings: Membrane with a distinct grayish or brownish tinge; the veins almost black; stigmal spot but little differentiated.

Male.—Not noticeably different from the female in size, structure, or markings.

Type.—Male; Collection of Museum of Comparative Zoology.

CALIFORNIA: Alta Meadow, near the Sequoia Giant Forest in the Sierras, 9000 ft., larvae in August 1917, adults emerge probably April or May, (W. M. Wheeler).

The above description is based on two paratypes loaned me by Professor Wheeler and is supplemented by his description as the specimens are in rather poor condition.

Vermileo opacus (Coquillett)

1904. *Pheneus opacus* Coquillett, Invert. Pac., 1 p. 21.

Resembling in general appearance *Leptogaster* of the Asilidae; antennal style indistinctly three segmented; mesonotum light gray opaque, with three dark brown stripes, the median one narrowly divided; pleura brownish with a somewhat pollinose pale stripe above the coxae; abdomen dark brown, shining, slender, the segments at the base broadly yellowish; legs elongate, slender, the hind pair about twice as long as the middle pair and with the femora and tibiae somewhat clavate; wings elongate, tapering gradually towards base, almost hyaline.

Male. (Type redescribed).—Length, "5 mm." (Coquillett). The abdomen is curled downward; were it straightened I believe the length would be 5.5 or 6 mm. Head: Front light brown pollinose, about twice as wide at vertex as at antennae; face light brownish pollinose, narrow, sides parallel; palpi small, dark brown; proboscis yellowish brown; antennae with first two segments brownish yellow, the third above, and the arista, dark brown; the first segment almost cylindrical, about one and one-half times the length of the second, the second and third subequal, the arista almost half again as long as the antennae, indistinctly three segmented, the first division a little less than half the length of the second "the two together about two-thirds the length of the remainder" (Coq.). Unless the apex of each arista has been broken off I should say that they were subequal to the third division.

Thorax; Mesonotum almost opaque, light gray or light brown pollinose in various lights with three dark brown stripes the median one narrowly divided, the two more lateral ones becoming fainter cephalad, the stripes slightly shining in certain lights; scutellum light brownish; pleura dark brownish, slightly shining, light brown pollinose, a broad pale pollinose stripe just above the coxae reaching to the halteres which is somewhat glistening in certain lights; halteres almost blackish, somewhat yellowish towards base of stalk; metanotum dark brown, somewhat light gray pollinose.

Abdomen: Slender, elongate, shining, bare, dark brown to almost blackish, segments two to six yellowish brown at base, broadly so except on the sixth.

Legs: Coxae pale yellowish, the hind pair slightly tinged with brownish; femora brownish yellow, the hind pair almost twice the length of the middle and darker, especially towards apex and distinctly clavate; tibiae concolorous with femora, the hind pair darker than the others, as long, but not quite so dark as the hind femora; tarsi dark brown, metatarsi yellowish brown.

Wings: Elongate gradually tapering towards base; veins dark brown; membrane slightly tinged with brownish, no stigmal spot.

Female.—Unknown.

Type.—The above described male, Ormsby Co. Nev. July 6, collected by Baker, [U. S. N. M., No. 6707.] The hind tarsi are lacking except for the metatarsi.

The only specimens are the three following males:

NEVADA: 1 ♂, Ormsby County, July 6, (C. F. Baker), [U. S. N. M.; *type*].

NEW MEXICO: 2 ♂, Alamogordo, May 2, 5, 1902, [A. N. S. P.].

Known only from the three specimens mentioned above, the two males from New Mexico are slightly smaller than the type, and have the brown metanotal stripes highly polished. The proboscis, palpi and front legs are wholly pale yellowish and the other legs are somewhat paler than in the type. The arista also is hardly longer than the rest of the antennae, although it is three segmented and the first segment of the antennae is a little shorter than in the type. They undoubtedly belong to this species, however.

While examining paratypes of *Vermileo comstocki* Wheeler, such a similarity was noticed between them and the type of *Pheneus opacus* Coquillett that a more careful study of the latter in reference to the full account and figures of *Vermileo* in Verrall's British Flies (Verrall, 1909: 257) showed *opacus* to be congeneric with *Vermileo*. Whether or not *Pheneus* is congeneric with *Vermileo* cannot at present be determined as Walker's description of the genus is poor and his *P. tibialis* has not been recognized since it was first described from Jamaica. Coquillett undoubtedly attempted to place his specimen in the somewhat regional genus *Pheneus* rather than in *Vermileo* which of course he did not at that time suspect occurred in this country. The larvae of *V. opacus* undoubtedly live in the sandy regions of western Nevada and of New Mexico, where their habits are probably similar to those of *V. comstocki* Wheeler and the European *V. degeeri* Macq.

BOLBOMYIA Loew

1850. *Bolbomyia* Loew, Program. d. k. Realschule Meseritz, p. 39.

1907. *Misgomyia* Coquillett, Proc. Ent. Soc. Wash., IX, p. 145.

Small, dark colored species; the first two antennal segments are small, the third suboval, somewhat tapering at tip and with a short terminal style which is indistinctly three or four-segmented; palpi prominent and hairy; eyes of female well separated; halteres with knob large, noticeably longer than stalk; tibial spurs prominent, 1:2:2; wings with anal cell closed at border or practically so; four posterior cells present.

GENOTYPE: *Bolbomyia nana* Loew.

Bolbomyia nana Loew

1862. *Bolbomyia nana* Loew, Berl. Ent. Zeits., VI, p. 188.

1907. *Misgomyia obscura* Coquillett, Proc. Ent. Soc. Wash., IX, p. 146.

General color chocolate brown; slightly shining in certain lights; front, face, thorax, abdomen and legs in certain lights with a grayish chagreened appearance due to many fine punctures in the cuticula, halteres same color as body, knob longer than stalk; legs brownish yellow; wings slightly tinged with brownish, fourth posterior cell contiguous with discal cell or with a short petiole.

Female.—Length, about 2.5 mm. Head: Front brownish, broad (shrunk in type so that true width cannot be determined, together with vertex with sparse rather long blackish hairs, brownish yellow pollinose and with a somewhat satiny appearance due to very fine puncturing; face with a median bulbous swelling much as in *Chrysopilus*; palpi and proboscis prominent, almost black, the former with a number of long blackish hairs, the latter with several at the tip; antennae almost black with first two segments small, the third large, suboval, and with a rather thick terminal three or four segmented style, which is somewhat shorter than the body of the segment.

Thorax: Mesonotum and scutellum with scattered rather long, stiff, blackish hairs; pleura and metanotum bare; halteres with knob concolorous with rest of body, the knob large and elongate being about twice the width of the stalk which is slightly paler.

Abdomen: Clothed with a few fine, pale, somewhat appressed hairs.

Legs: Brownish yellow, femora, somewhat darker, the whole with noticeable fine dark hairs; tibial spurs well developed.

Wings: Membrane noticeably tinged with brownish which is considerably darker along costal region; stigma fuscous, diffuse; veins dark brown; second basal cell contiguous with the discal cell or petiolate.

Male.—Similiar to male.

Type.—Female; Washington, District of Columbia, (Osten Sacken), [Museum of Comparative Zoology].

Specimens Examined: 17; 12 males, 5 females.

NEW HAMPSHIRE: 1 ♀, White Mountains (Morrison), [U. S. N. M.].

NEW YORK: 1 ♂, Colden, May 23, 1909, (M. C. Van Duzee), [A. N. S. P.]; 2 ♂, [U. S. N. M.]. 1 ♂, North Evans, May 25, 1913, (M. C. Van Duzee), [U. S. N. M., ex Aldrich]; 1 ♂, May 14, 1910, (M. C. Van Duzee), [U. S. N. M.]; 3 ♂, Danby, May 20, 1920; 1 ♂, May 10, 1920, 2 ♀, May 10, 20, 1920, (R. C. Shannon), [Shannon].

PENNSYLVANIA: 1 ♂, [U. S. N. M., ex. Aldrich].

MARYLAND: 1 ♂, Forest Glen, April 28, 1914, (O. Heidemann), [U. S. N. M.].

VIRGINIA: 1 ♀, opposite Plummer's Island, April 28, 1907, (W. L. McAtee), Coq., [U. S. N. M.; the *type* of *Misgomyia obscura*, no. 1150 (or 11510)].

DISTRICT OF COLUMBIA: 1 ♀, Washington, (Osten Sacken), [M. C. Z.; *type*].

MICHIGAN: 1 ♂, Battle Creek, [U. S. N. M., ex. Aldrich].

HILARIMORPHA Schiner

1860. *Hilarimorpha* Schiner, Wien. Ent. Monatschr., IV, p. 54.

1902. *Hilaromorpha* Melander, Trans. Am. Ent. Soc., XXVIII, p. 336.

Small, bare, almost black or dark brownish flies; antennae with the first two segments small and third much larger, elongate sub-oval tapering at tip, with a short, two-segmented, terminal style; eyes of the male holoptic, those of the female dichoptic; tibiae apparently without spurs; empodia lacking; third and fourth veins forked, discal cell lacking, anal cell closed.

GENOTYPE: *Hilarimorpha singularis* (Egger.).

Key to Species of *Hilarimorpha*

1. Legs blackish, knees narrowly reddish yellow (Cal.).....*obscura* Big.
Legs yellowish or light brown.....2
2. Legs yellowish; halteres dark brown (Ill.).....*mikii* Will.
Legs dark brown; halteres brownish yellow, knob somewhat infuscated (N. H., Vt.).....*pusilla* Johns.

Hilarimorpha mikii Williston (Pl. I, fig. 3)

1888. *Hilarimorpha mikii* Williston, Psyche, v, p. 100.

1902. *Hilaromorpha mikii* Melander, Trans. Am. Ent. Soc., XXVIII, p. 337.

In general appearance a dark brownish yellow; antennae with third segment suboval, tapering towards tip and with a two-segmented terminal style, the second segment of which is very short and bristle-like; abdomen quite distinctly banded with brownish

and brownish yellow; legs yellowish; wings slightly tinged with brownish.

Male.—Length, 3 to 4 mm. Head: Face almost black in ground color, grayish pollinose, sides bare and as seen under the binocular with several very fine longitudinal wrinkles; palpi and proboscis brownish yellow, the latter the darker of the two, the former with very fine pale sparse hairs; antennae brownish, the style and the third segment towards the base somewhat yellowish, the third segment suboval, tapering somewhat towards tip and slightly concave above style; style thickened, two segmented, the second short and bristle-like; the style somewhat shorter than the length of the body of the third segment.

Thorax: Mesonotum and scutellum almost blackish in ground color, heavily dirty yellowish pollinose, bare except for a few very small fine pale hairs; pleura somewhat paler, with pollen not so thick and more grayish in color; halteres brownish yellow with the knobs somewhat infuscated.

Abdomen: Each segment with the cephalic border narrowly brownish black, the remainder of each segment light brownish yellow; bare except for sparse short, fine, pale hairs; hypopygium blackish.

Legs: Yellowish, femora slightly tinged with brownish; last tarsal segment very slightly darkened.

Wings: Slightly tinged with pale brownish, stigma diffuse, elongate, a somewhat darker brownish.

Female.—Unknown.

Type.—This species was described from four males; Carlinville, Illinois, collected by Charles Robertson.

Specimens Examined: 2: both males.

ILLINOIS: 1 ♂, "S. Ill.," (Charles Robertson), [U. S. N. M.; labelled "taken with types," therefore probably one of the types]; 1 ♂, Carlinville, (Charles Robertson), [U. S. N. M.; probably one of the types].

COLORADO.³⁰

OREGON.³¹

Hilarimorpha obscura Bigot

1887. *Hilarimorpha obscura* Bigot, Bul. Ent. Soc. France, 1887, p. CXLII.

1902. *Hilaromorpha obscura* Melander, Trans. Am. Ent. Soc., XXVIII, p. 333.

1837. ?*Microsania stigmatalis* Zetterstedt, Ins. Lapp. Dipt., p. 534.

This species has not been recognized since it was first described. Following is a rather free translation of Bigot's description:

"*Female*.—Length, 5 mm. Black, venter grayish, pollinose; knees obscurely reddish yellow; wings infuscated, darker along the costal border; stigmal spot almost black, diffused.

"Entirely of an opaque black, except the articulation of the knees tinged with

³⁰ Recorded from Colorado Springs by Tucker (1907: 89).

³¹ Recorded from Hood River by Cole and Lovett (1921: 237).

reddish yellow; venter pollinose and of an obscure gray; wings darkened, more so along the costal border, with an elongate diffused, blackish, stigmal spot."

"California, 1 specimen."

Several years ago Dr. Aldrich told me he had provisionally placed *H. obscura* as a synonym of *Microsania stigmatalis* Zett. (equals *Platycnema imperfecta* Lw.) from the description of the latter in 1920. Under date of June 21, 1928, Dr. Aldrich writes me "Glancing at it again it seems to me that this synonymy is very probable. The elongated blackish stigma and other features agree very well, but it is impossible to decide positively."

***Hilarimorpha pusilla* Johnson**

1923. *Hilarimorpha pusilla* Johnson, Occ. Papers Bost. Soc. Nat. Hist., v, p. 70.

I have not had an opportunity to examine very carefully Mr. Johnson's types of this interesting little species. I prefer therefore to quote in full his original description with its accompanying data:

"♂. Head and antennae black, the third joint of the antenna about twice as long as wide, minutely pubescent, and the two-jointed style slightly more than one-half its length; ocelli yellow, prominent. Thorax and abdomen dull black with a thin brownish pollen. Halteres dark brown. Legs light brown. Wings brown with darker brown vein, the venation similar to the figure given in Williston's Manual (fig. 1, p. 160) except that the second basal cell is slightly longer. Length 2.5 mm."

"Two specimens: *holotype*, Hanover, New Hampshire, July 7, 1908; *paratype*, Norwich, Vermont, July 8, 1908. In the collection of the Boston Society of Natural History."

SYMPHOROMYIA Frauenfeld

1856. *Atherix* Rondani, Dipt. Ital. Prodr., 1, p. 154.

1867. *Symphoromyia* Frauenfeld, Verh. Zool.-bot. Ges. Wien, xvii, p. 497.

The genus *Symphoromyia* has been admirably revised by Aldrich (1915: 113-142). Although I have seen a considerable quantity of material in this genus, including that in the United States National Museum and in the collection of Dr. Aldrich, both of which he has arranged, I have been able to add but little to his excellent paper. I therefore quote the characters of the genus as given by Aldrich and copy his key to the species. A few additional notes are appended and corrections made.

"The genus includes Leptid flies with five posterior cells, the anal cell open; third antennal joint simple, rather deep vertically, attached above its middle,

usually kidney-shaped (sometimes concave in profile below the arista, then not quite kidney-shaped); arista subapical; tibial spurs none in front, two in the middle, one behind, but often quite weak in males."

GENOTYPE: *Atherix melaena* Meigen.

Key to Species of *Symphoromyia*

MALES

1. Face, with long, erect pile on the sides. 2
 Face bare on the sides. 8
2. Proboscis slender, with narrow labella, as long as height of head (Cal.)
 cruenta Coquillett
 Proboscis normal, short, the labella fleshy. 3
3. Third antennal joint concave in profile at apex, below the arista. 4
 Third antennal joint kidney-shaped as usual, hence convex. 7
4. Sides of abdominal segments two to four broadly yellow in ground color (Wash., Cal.)
 sackeni Ald.
 Sides of abdomen black. 5
5. Palpi and third antennal joint yellow or reddish; pile on head very dense and long, reddish (Cal.)
 pilosa Ald.
 Palpi and third antennal joint black. 6
6. Pile of sides of face and of first antennal joint very dense; fourth posterior cell closed or nearly so (Cal.)
 barbata Ald.
 Pile of moderate density; fourth posterior cell wide open or slightly narrowed (Cal., Wash.)
 johnsoni Coquillett
7. Fourth abdominal segment expanded below on each side, with a row of stiff black hairs along the projecting margin (Or.; Wash.—*comata* Bigot)
 pachyceras Williston
 Fourth abdominal segment plain. 7a
- 7a. Abdomen opaque black above; vertical diameter of first antennal segment almost one-third that of head and vertical diameter of the third only about one-half that of the first; pile of palpi bushy and black; 5½ mm. (Idaho & Wash.)
 inquisitor Ald.
 Abdomen lead-colored above; vertical diameter of first antennal segment only about one-fourth that of head and vertical diameter of third only slightly less than that of first; pile of palpi less dense and pale; 4 mm. (Mont., Wash.)
 plumbea Ald.
8. Front and middle tibiae yellow. 9
 All tibiae black, knees narrowly reddish. 12
9. Halteres yellow (Penna., Ala., N. H., Ohio; N. M., Col., Utah; Mont., Idaho; Alberta—*flavipalpis* Adams) (Pl. I, fig. 6)
 hirta Johnson
 Halteres infuscated. 10
10. Abdomen very shining (Br. Col., Wash., Or., Cal., Nev.—*picticornis* and *latipalpis* Bigot)
 plagens Williston
 Abdomen opaque. 11

11. Small, light-colored species, the first antennal joint with mostly white pile below (N. J.).....**cinerea** Johnson
Medium sized species with black pile on the first antennal joint (Cal., Col.—*fera* Coquillett).....**trivittata** Bigot
12. Body gray pollinose, opaque.....13
Body black, velvety, or shining.....14
13. A distinct median gray line divides the broad, central dark-brown stripe of the mesonotum (Cal.).....**trucis** Coquillett
The central stripe not so divided (Mont., Saskatchewan, N. H.).. **montana** Ald.
14. First antennal joint greatly elongated and swollen, its vertical diameter over one-fourth that of the head (Br. Col., Alberta, Wash., Mont., Col., Utah, Cal.).....**atripes** Bigot
First antennal joint much smaller, its vertical diameter only about $\frac{1}{6}$ that of the head.....15
15. Rather velvet-black species, pile of abdomen yellow (Br. Col., Wash.)
kincaidi Ald.
Almost shining species, pile of abdomen black (Col.).....**pullata** Coquillett

FEMALES

1. Third joint of antenna concave at apex, below the arista.....2
Third joint convex as usual.....5
2. Abdomen yellow in ground color (Wash., Cal.).....**sackeni** Ald.
Abdomen black.....3
3. Sides of face with a little pile (Wash., Cal.).....**johnsoni** Coquillett
Sides of face bare.....4
4. Mesonotum with three brown stripes, all narrow and very distinct (Cal.)
securifera Coquillett
Mesonotum with indistinct, broader, unequal stripes (Idaho, Mont., Cal.)
inurbana Ald.
5. Knob of halteres infuscated.....6
Knob yellow.....11
6. Abdomen shining black, broadly red at apex (Cal.).....**limata** Coquillett
Abdomen not as indicated.....7
7. Sides of face pilose.....8
Sides of face bare.....10
8. Proboscis slender, longer than height of head (Cal.).....**cruenta** Coquillett
Proboscis shorter, with broad, fleshy labella.....9
9. Pale plumbeous species, the hairs above the notopleural suture white (Mont.)
plumbea Ald.
Much darker, the hairs above the notopleural suture black (Or., Cal., Mont.—*comata* Bigot).....**pachyceras** Williston
10. Front above antennae as wide as the eye; tibiae black (Alaska, Br. Col., Alberta, Mont., Wash., Col., Utah, Cal.).....**atripes** Bigot
Front above antennae much wider than the eye; tibiae yellow (Saskatchewan; Mont., Cal., N. H.).....**montana** Ald.

11. Tibiae black, knees narrowly reddish.....12
 Tibiae yellow.....13
12. Front above antennae about one-half wider than the eye (Idaho, Wash.)
inquisitor Ald.
 Front above antennae about as wide as the eye (Wash., Br. Col.)...*kincaidi* Ald.
13. Abdomen shining reddish-brown except the first segment (Br. Col., Wash., Nev.—*picticornis* and *latipalpis* Bigot).....*plagens* Williston
 Abdomen black in ground color.....14
14. First antennal joint yellow, the rest black (Cal.) (*modesta* Coquillett)
varicornis Loew
 First joint not paler than the others.....15
15. Femora blackish (Penna., to Cal. etc.—*flavipalpis* Adams)...*hirta* Johnson
 Femora yellow.....16
16. Pile of front and of mesonotum coarse and long, black (Col.)...*fulvipes* Bigot
 Pile of front short, black, that of mesonotum largely white (N. J.)
cinerea Johnson

***Symphoromyia plumbea* Aldrich**

1915. *Symphoromyia plumbea* Aldrich, Proc. U. S. Nat. Mus., XLIX, p. 138.

The male is here described for the first time. Similar to female except as follows: Eyes not quite contiguous; first antennal segment considerably swollen especially below, head pollinose and with moderately dense hairs mostly blackish and for most part at least as long as diameter of the segment; third segment blackish as in female, convex below arista, vertical diameter not quite that of the first segment. Ocellar tubercle and face concolorous with rest of body; the former with long blackish hairs, the latter with a little shorter, moderately dense blackish hairs on sides. Palpi black with long dense whitish pile. Hairs on mesonotum, scutellum and abdomen somewhat longer and more abundant than in female. Length about 4 mm.

Allotype.—Male, from Alnota, Wash., [A. L. Melander].

In connection with the description of the male of *S. plumbea* Ald. it may be of interest to note that there is a female *Symphoromyia* in the Melander collection also from Alnota, Wash., May 25, 1913. It agrees very well with Aldrich's description of the single type female except that it measures just a little under 4 mm. and the mesonotum has a distinct, longitudinally divided, brownish median stripe on either side of which is a less distinct brownish patch just cephalad of the suture. I do not hesitate in referring the specimen to *plumbea*.

ATHERIX Meigen

1782. *Sylvicola* Harris, Expos. Eng. Ins., p. 100.
1803. *Atherix* Meigen, Illiger's Mag. f. Ins., II, p. 271.
1820. *Nodulis* Megerle von Muehlfeld, in Meigen, Syst. Besch. II, p. 81.
1856. *Ibisia* Rondani, Dipt. Ital. Prodr., I p. 154.
1856. *Pelechoidocera* Bigot, Ann. Soc. Ent. Fr., (3), IV, p. 66.

Medium sized flies with spotted or banded abdomen and banded wings; first two segments of the antennae subequal, subglobose, the third somewhat kidney-shaped, with a subdorsal arista; eyes of males contiguous, those of the females separated; tibial spurs 0 : 2 : 2; anal cell closed somewhat before the border of the wing.

GENOTYPE: *Sylvicolae melancholica* Harris (as *Rhagio diadema* Fabricius), the first species by designation of Latreille.

Atherix pachypus Bigot

1887. *Atherix pachypus* Bigot, Bul. Soc. Zool. Fr., XII, p. 117.

The collection of Mr. C. W. Johnson contains three males, determined as this species, from Seattle, Washington. Mr. Johnson may be correct in his determination, but unfortunately, however, I was unable to check up on this matter when I last saw his collection. The University of Washington has two males from Snoqualmie, Washington, August 28, 1892 determined as *pachypus*, which seem to agree fairly well with the description. Further than this no other specimens have been referred to Bigot's species since it was first described. A translation of the original description follows:

"Length, 7 mm. Male. Tibiae and posterior metatarsi dilated. Antennae and palpi fuscous, fuscous pilose; proboscis fuscous; face grayish white, below with fuscous hairs; beard white; thorax black, strongly shining, with fine grayish lines; scutellum black; pleura and coxae obscurely grayish; halteres fuscous; abdomen tawny on each side with yellow hairs, first segment black at the base, second and third with three black spots, the following at the base broadly bordered with black; feet tawny, tarsi at apex infusate; wings whitish, fuscous variegated.

"Posterior tibiae and metatarsi somewhat dilated, the first bordered on the outer surface with short fine hairs. Antennae and palpi blackish with brownish hair; face a grayish white, clothed with gray hair on the lower part, beard white; thorax, scutellum, blackish, somewhat shining, the first with four gray lines; pleura and coxae blackish with gray reflections; halteres brown; abdomen tawny, clothed laterally with some yellowish hairs, first segment black at base, second and third each with three black spots, the lateral ones narrow, all the other segments with the base broadly tinged with black; legs tawny, tarsi brownish at the apex; wings

clear, the base, three broad irregular and diffused transverse bands, not reaching the inner and posterior borders, and finally towards the tip, two elongate spots, wholly of a rather dark brown, anal cell closed before the border.

"North America, Washington Territory, 1 specimen."

Atherix varicornis Loew

1872. *Atherix varicornis* Loew, Berl. Ent. Zeits., xvi, p. 58, no. 13.

An examination of Loew's single type female from "California (H. Edwards)" at once disclosed the fact that this is identical with *Symphoromyia modesta* Coq. which being the case, the later name becomes *S. varicornis* Loew.

Atherix variegata Walker (Pl. I. fig. 2, Pl. III. fig. 21)

1848. *Atherix variegata* Walker, List Dip. Brit. Mus., I, p. 218.

Thorax grayish pollinose the mesonotum with three more or less distinct darker stripes, the middle one sometimes narrowly divided; halteres yellowish, knobs infuscated; abdomen of male yellowish to brownish yellow, variably marked with a row of median black spots which are indistinctly extended laterally into bands, or with bands above, more distinct at base or apex or both; that of female grayish or brownish yellow with black bands; legs yellowish brown, tarsi infuscated, the hind tibiae and metatarsi of the male somewhat swollen; wings with three more or less distinct brownish bands.

Male.—7 to 8 mm. Head: Frontal triangle, which extends far towards ocellar tubercle, front, and face grayish pollinose, the frontal triangle and sides of face, especially the lower half with rather long blackish hairs; palpi almost yellowish to blackish grayish pollinose, proboscis blackish, both with blackish hairs; beard whitish; antennae almost black.

Thorax: Mesonotum blackish, gray pollinose, with three more or less distinct, broad, almost black stripes showing through, the middle one sometimes narrowly divided; scutellum somewhat grayish pollinose also, it and the mesonotum with moderately long fairly abundant, blackish hairs; pleura grayish pollinose, bare; halteres yellowish, knob blackish.

Abdomen: Yellowish to brownish yellow somewhat variably marked with a median row of black spots or with black bands or with a combination of both, the first segment and the last two or three before the hypopygium often wholly black; dorsum clothed with very few to rather abundant and longer fine pale hairs which are longer on the sides and sometimes intermixed with a few black ones; hypopygium usually brownish yellow.

Legs: Brownish yellow; femora sometimes somewhat darkened; tarsi, except metatarsi blackened at least at apex of segments, the hind femora and metatarsi somewhat swollen.

Wings: Membrane hyaline, ornamented by three irregular brownish bands; veins dark brown; stigma somewhat darker than the bands, elongate.

Female.—Length 6 to 8.5 mm. General color paler than in male. Similar to male except as follows: Front just above antennae wider than the eye, a little narrower at vertex, with short, black, scattered hairs; hair on sides of face paler above; palps yellowish; membrane surrounding the first pair of thoracic spiracles and the humeral calli, yellowish; abdomen with a blackish band at the base of each segment, the hind border grayish pollinose, sometimes tinged with brownish yellow; wing markings usually paler.

Specimens Examined: About 74 males and females (in addition to many dead females on egg-masses).

NOVA SCOTIA: 1 ♀, Cheticamp, Cape Breton Island, June–July, 1917, (F. Johnson), [C. N. M.].

NEW BRUNSWICK: 1 ♀, Barber Dam, June 23, 1914, (J. D. Tothill); 1 ♀, Harcourt, June 27, 1917, (M. B. Dunn), [all Tothill].

QUEBEC: 1 ♂, Hull, June 13, 1913; 1 ♀, Rigaud, May 24, 1906, (G. Beaulieu); 1 ♂, Kazubazua, June 6–10, 1927, (W. J. Brown), [all C. N. M.].

ONTARIO: 1 ♀, Ottawa, [U. S. N. M.]. 2 ♀, Low Bush River, Lake Abitibi, July 17, 1925, (E. M. Walker), [W. G. Dietz]. 1 ♀, Mamamattawa, (? equals Mattawa, Ont.), (W. G. Wilson), [U. S. N. M.].

MANITOBA: 3 ♀, Aweme, June 21, 30, 1911, (N. Criddle) [A. N. S. P.]; 1 ♂, 1 ♀, June 23, 1926 and 1 ♂, June 9, 1923, Aweme, (R. M. White) [W. G. Dietz]; 1 ♀, May 24, 1915 and 1 ♀, June 18, 1913, Aweme, (N. Criddle), [C. N. M.].

MCKENZIE, NORTH WEST TERRITORY: 2 ♀, Fort Wrigley, July 17, 1922, (C. H. Crickman), [C. N. M.].

MAINE: 1 ♂, Orono, [Me. Agr. Exp. Sta.; Lot 1615, sub. 49].

NEW HAMPSHIRE: 1 ♀, Franconia, [U. S. N. M.]; 1 ♂, [A. M. N. H., ex Osten Sacken].³²

MASSACHUSETTS:³³

CONNECTICUT: 1 ♂, Northfield (or Northford), May 24, 1918, (M. P. Zappe), [Conn. Agr. Exp. Sta.]. 1 ♂, South Meriden, June 4, 1915, (Harry L. Johnson), [B. S. N. H.].

NEW YORK: 1 ♀, Rochester Junction, June 9, 1914, (M. D. Leonard), [C. U.]. 1 ♂, Pike, June 1, 1901, [N. Y. S. M.]. 1 ♀, Ithaca June 1, 1916, (R. C. Smith), [Kansas]; 1 ♂, Ithaca, May 13, 1913, [C. U.]. The dead bodies of many females on their dried egg-masses found during the summer of 1920 by M. D. Leonard on piles in the water near the Comstock cottage near Taughannock on Cayuga Lake; 1 ♂, McLean, May 25, 1912, [C. U.]. Many males taken resting on needles of a pine tree at Riders Mills, May, (S. C. Bishop), [N. Y. S. M.].

NEW JERSEY: 1 ♂, Lakehurst, July, [W. G. Dietz]. 1 ♀, Singac, July, [A. M. N. H.].

³² Also reported from Jefferson by Johnson (1925: 106).

³³ Recorded from Amherst by Johnson (1925: 106).

PENNSYLVANIA: 1 ♂, Danville, May 18, 1913; 1 ♀, Harrisburg, May 22, [all Pa. Dept. Agr. Coll.; no. 9222].

MARYLAND: 1 ♀, June 3, 1914, (R. C. Shannon), and 1 ♀, April, 1908, (E. A. Schwarz) on Plummer's Island, [U. S. N. M.; the latter bred from a pupa found in sand and pinned with exuvium]. 1 ♀, Riverdale, June, 1916, (F. R. Cole), [Cole].³⁴

VIRGINIA: 2 ♂, Glencarlyn, May 9, [Banks].

GEORGIA: 3 ♀, St. Simon Island, April 22 to May 12, 1911, (J. C. Bradley); 1 ♂, Clayton, May 18 to 26, 1911, (J. C. Bradley), [all C. U.].

INDIANA: 1 ♀, Lafayette, May 1916, (J. J. Davis; taken "resting on tree at night"), [U. S. N. M., ex Aldrich].

ILLINOIS: 3 ♀, [U. of Ill.; one of which is no. 45654].

MINNESOTA: 1 ♀, St. Anthony Park, May 10, 1897, [U. of Minn.; no. 22, sub. 129].

NEW MEXICO: 2 ♂, 1 ♀, Santa Fe, (Osler), [W. G. Dietz]. 1 ♂, Pecos, July 8, (T. D. A. Cockerell), [U. S. N. M.].

COLORADO: 1 ♀, Pagosa Springs, June 22 to 24, 1919, (F. E. Lutz), [A. M. N. H.].

UTAH: 2 ♀, Beaver Canyon, [Pa. Dept. Agr.]; 1 ♀, [A. M. N. H., ex J. Bequaert; Cat. no. 369]; 1 ♂, 9 ♀, [Brook. Mus.].

WYOMING: 6 ♂, Green River, 6100 ft., July 2, 1920, (F. E. Lutz), [A. M. N. H.; nos. F4736 and F4737].

MONTANA: 1 ♀, Bozeman, July 12, 1912, [U. S. N. M., ex Aldrich]. 1 ♀, Big Timber, July 14, 1917, (H. G. Dyar), [U. S. N. M.]. 1 ♂, 1 ♀. Three Forks, July 12, 1912, [Mont. Agr. Exp. Sta.].

IDAHO: 1 ♂, Hailey, [U. S. N. M., ex Aldrich].

CALIFORNIA: near Canby, Modoc County, on the Pitt River, (see under "Habits" below).

Among the specimens from which the above distribution is compiled, there may be present in the Western forms some referable to *A. pachypus* Bigot; if so I fail to recognize them as such, nor can I see any appreciable differences between Western and Eastern specimens.

Habits.—As is well known, the females, *A. variegata* (and the fairly common European *A. ibis* Fab. to which it is closely related) have often been observed to lay their eggs in masses or bunches on twigs over streams. The bodies of the dead flies adhere to the egg-mass and other females then lay eggs over or surrounding them so that the mass may finally attain a rather considerable bulk—several inches deep—and contain the bodies of many dead females. This habit of *A. variegata* has been described by J. E. Ives (1890: 39), based on observations at Pemberton, New Jersey. The young

³⁴ Also reported from Beltsville in Paint Branch by C. T. Greene, Proc. U. S. N. M., LXX, Art. 2, p. 11, (1925).

larvae, upon hatching, drop into the water where they are said to live predaceously until maturity. In the summer of 1920 I observed several such masses, containing the dead bodies of the females, attached to old piles in Cayuga Lake not far from Ithaca, New York.

The former use of these flies as food by the Indians in the Pitt River section, (chiefly near the present town of Canby) Modoc County, California, has been most interestingly described in an article by Dr. J. M. Aldrich (1912: 159-163), entitled "Flies of the Leptid genus *Atherix* used as food by California Indians (Dipt.)." If I have been correct in referring all western specimens to *A. variegata* it is therefore this species of which Dr. Aldrich makes such a rather unusual record.

Although, as far as I am aware, *A. variegata* has not been reported as a blood-sucker, Knab (1912: 108-110) records the determination of a specimen of *A. longipes* Bell., taken in the State of Oaxaca, Mexico, by D. L. Crawford with the statement that it "is a fierce biter and blood-sucker."

***Atherix vidua* Walker**

1849. *Atherix vidua* Walker, List. Dipt. Brit. Mus., IV, p. 1153.

This species has not been recognized since it was originally described. Following is Walker's description:

"Mas et fem. Nigro-cinerea, capite antico cano, antennis nigris basi ferrugineis, pedibus piceis, alis cinereis ad costam subfulvis.

"Body dull black, clothed with black hairs: head gray with a hoary tinge in front; eyes pitchy, convex; all the facets of the female very small; those of the male rather larger on the fore part than elsewhere: sucker, palpi and feelers black; first and second joints of the feelers dark ferrugineous: chest slightly gray somewhat pitchy on either side near the base of the wings: legs pitchy, clothed with black hairs; claws black; foot cushions dark tawny: wings hoary with a slight tawny tinge along the fore border from the base to the brand, which is brown; wing ribs tawny; veins black, tawny at the base; poisers pitchy. Length of the body 1- $\frac{3}{4}$ lines [equals about 4 mm.]; of the wings 4 lines [equals about 8 mm.].

"St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

I wrote Mr. F. W. Edwards of the British Museum for information as to the identity and characters of Walker's species and he was kind enough to report on the type series as follows:

"May belong to genus *Ptiolina*. Antennae agree with Willis-

ton's figure, but hind tibiae have two spurs (inner very small, much smaller than outer). Species much smaller than *A. variegata*, no color difference in sexes, body all black, hind tibiae and tarsi not at all swollen, wings unmarked except for stigma. 5 males, 1 female."

The species is therefore clearly not an *Atherix* but it is impossible, however, to say at present just where to place it.

In this connection it is interesting to note that of the six females in the Museum of Comparative Zoology at Cambridge determined by Loew and Osten Sacken as this species, five are *Symphoromyia hirta* Johnson and the sixth is *S. montana* Aldrich.

RHAGIO Fabricius

1775. *Rhagio* Fabricius, Syst. Ent., p. 69.

1782. *Sylvicola* Harris, Expos. Eng. Ins., p. 100.

1805. *Leptis* Fabricius, Syst. Ant., p. 609.

Small to moderately large flies, usually of a fairly slender form, clothed with short to moderately long pale or blackish hairs; antennae with first and second segments subglobose, the third usually subequal to the others, subglobose or somewhat conical and with a slender arista which is longer than the rest of the antenna and, almost without exception, terminal. Front of the females hardly ever more than one-half as wide as the eye; eyes of the males almost always contiguous, curving from the point of separation to the cheeks in such a way that the sides of the face are convex, usually distinctly so; in four species however (*gracilis* Johnson, *brunneipennis* n. sp., *californicus* n. sp., and *pollinosus* n. sp.) they are separated in the males by the width of the ocellar tubercle and the sides of the front are parallel; tibial spurs 0: 2: 2; fourth posterior cell open and anal cell usually open but sometimes closed at the border of the wing or even distinctly petiolate (e. g. *gracilis* Johns. always and sometimes in *mystaceus* and others).

GENOTYPE: *Musca scopolacea* Linn.

Change in the Generic Name.—In his *Systema Entomologiae*, Fabricius erected the genus *Rhagio*. In his *Systema Antliatorum*, he changes the name to *Leptis*. In a footnote on page 70 he says that he has made this change because of the too great similarity of the name *Rhagio* to *Rhagium* of the beetles. I can see no basis for adopting his later name since the name *Rhagio* is different in spelling from *Rhagium*. Were they derived from the same stem there

might be some basis for this change but although the root of the two words is undoubtedly the same they are derived from two different stems. I have therefore, in accordance with some of the leading European workers, adopted the older name *Rhagio* instead of *Leptis*, and consequently changed the family name to *Rhagionidae*.

Key to Species of Rhagio

1. Wings almost uniformly dark brownish, or spotted or banded with brownish, or many of the veins bordered with brownish.....2
 Wings hyaline, or but lightly tinged with grayish or brownish either wholly, or merely on apex or along costal border.....8
2. Wings almost uniformly dark brownish, more distinctly darker, however, along costal border; eyes separated by width of ocellar tubercle
 brunneipennis n. sp.
 Wings not uniformly dark brownish.....3
3. Wings spotted or irregularly banded.....4
 Wings almost hyaline, with some longitudinal veins or crossveins or both, yellowish, not spotted or banded.....6
4. A single spot near center of first posterior cell just above apex of discal cell, rarely wanting.....5
 Two spots near center of first posterior cell, one basad and one apicad of apex of discal cell; abdomen with more or less brownish yellow, or, in female, fore tibiae whitish basally.....**punctipennis** Say
5. Abdomen with yellow bands; wings with two irregular bands and tips brownish; length, 6-9 mm.....**mystaceus** Macq.
 Abdomen without any pale coloration; wings spotted rather than banded; length, 5-6 mm.....**plumbeus** Say
6. Abdomen not spotted or banded.....**ochraceus** Lw.
 Abdomen with distinct row of dorsal spots which may be expanded to form partial bands.....7
7. Length 12-14 mm. (Cal.).....**costatus** var. **limbatus** n. var.
 Length 9-13 mm. (S. C., Miss., Fla.).....**albicornis** Say
8. Abdomen wholly blackish in ground color; length 5-6 mm.; eyes of male separated by width of ocellar tubercle.....9
 Abdomen with more or less yellowish or brownish yellow; usually somewhat larger species; eyes of male contiguous (except in *gracilis*).....10
9. Abdomen somewhat shining, never pollinose; wings clear..**californicus** n. sp.
 Abdomen gray pollinose, usually opaque but sometimes slightly shining; wings slightly tinged with grayish.....**pollinosus** n. sp.
10. Third segment of antennae concave above the arista which arises below the median axis of the segment.....**concavus** n. sp.
 Third segment of antennae normal, more or less distinctly convex, at least never concave above the arista which arises on the median axis of the segment.....11

11. The black markings of the abdomen confined for most part to the terminal half 12
 All or nearly all the abdominal segments broadly banded with black or with a median black spot 14
12. Black markings of abdomen confined to a lateral spot on three terminal segments (N. Y.) **terminalis** Lw.
 Basal bands or median spots for most part only on terminal half of abdomen certain specimens of **vertebratus** Say
 Segments 4 and 5 of abdomen with a blackish spot on each side, those caudad almost wholly blackish (Nev.) **flavoniger** Coq., ♀
 Terminal half of abdomen wholly blackish, or segments narrowly edged behind with yellowish; the basal half with or without black spots on each segment 13
13. Larger species, 9–10 mm.; segments 2–4 of abdomen, each with a large black median spot; pile of palpi whitish; that of abdomen no longer on sides than on disc and black **maculifer** Big.
 Smaller species, 6–8 mm.; segments 2–4 of abdomen often immaculate or with but a small median black spot; pile of palpi black; that of abdomen distinctly longer on sides than on disc and whitish **dimidiatus** Lw.
14. Abdomen with a series of median dorsal spots which may however in some cases tend to expand laterally to form partial bands 15
 Abdomen with segments broadly banded at base with black or almost wholly black so that only the caudal border is narrowly edged with yellowish. . . . 16
15. Large species, 12–14 mm.; front coxae brownish yellow; abdominal spots but rarely forming bands on caudal segments; wings usually tinged with brownish yellow, especially along costal border, stigmal spot brownish yellow, not well defined (Cal.) **costatus** Lw.
 Smaller species, about 7–9 mm.; front coxae blackish; abdominal spots usually replaced by bands on caudal segments; wings more nearly hyaline but costal cell often somewhat yellowish, stigmal spot usually dark brownish and better defined (principally confined to the Eastern States)
 typical **vertebratus** Say
16. Black bands of abdominal segments usually so wide that only caudal border is narrowly yellowish; front coxae blackish; femora usually blackish or dark brownish (N. W. States) **incisus** Lw.
 Black bands of abdominal segments rarely occupying more than basal half; front coxae yellowish or brownish yellow; femora for the most part usually yellowish, although the front and hind pairs may be darkened towards the tip 17
17. A noticeably slender species with long slender legs; femora and tibiae pale yellowish; anal cell closed before the border, petiolate; eyes of male separated by width of ocellar tubercle; band of caudal abdominal segments no broader than the others **gracilis** Johns.
 A stouter species with legs stouter and shorter; front and middle femora often darkened towards tip; anal cell open; eyes of male contiguous; bands of caudal abdominal segments often occupying nearly the whole segment
hirtus-scapularis form of **vertebratus** Say

The following species are omitted from the above key: *albibarbis* Bigot, *boscii* Macquart, *hoodianus* Bigot, *intermedius* Walker, *limbipennis* and *obscuripennis* of Bigot, *palpalis* and *pleuralis* of Adams and *pruinus* Bigot. I am unable to recognize them at present and no specimens have, I feel, been with sufficient certainty referred to any of them since they were originally described.

Rhagio albibarbis Bigot

1887. *Leptis albibarbis* Bigot, Bul. Soc. Zool. France, XII, p. 114.

1908. *Rhagio ablibarbis* Kertész, Cat. Dip., III, p. 302.

A translation of Bigot's original description follows:

"Length, 10 mm.

"♀ Antennae dark fuscous; palpi of the same color, whitish pilose; labellum fuscous; front fuscous; face gray, white pilose, beard whitish; thorax gray, obscurely brownish yellow behind, broadly trivittate with fuscous, median stripe double, pleura dark grayish; halteres pale yellow; scutellum dirty brownish yellow; abdomen reddish yellow, a narrow line on each side four times interrupted, black, segments two and three at base with a black spot, four, five and six marked with a broad band at base, sinuous, black, seven and the remainder on each side and at base black; coxae and feet brownish yellow, tarsi at apex strongly infuscate; wings very pale yellow, stigmal spot grayish.

"Antennae and palpi a dark yellowish, the latter with long white hairs; labellum and front blackish; face gray with white hairs; beard white; thorax gray with three broad brown bands, the intermediate appearing double, pleura grayish brown, the posterior border a little reddish; scutellum dark yellowish, halteres pale yellowish; abdomen tawny with yellowish hairs on the sides, 1st segment black at base, 2nd and 3rd with a black spot towards the base, 4th, 5th and 6th with a broad black, basal, sinuous band, the following black, bordered with yellowish, on each side of the abdomen is a black line four times interrupted at the sutures; coxae and feet yellowish, very lightly tinged with brownish at the tip; wings a very pale yellowish, stigmal spot a pale gray.

"North America, Washington Territory 1 specimen."

Cole and Lovett (1921: 236) record this species from Hood River, Oregon, June 2, and Forest Grove Oregon, May 17 (F. R. Cole). The Boston Society of Natural History Collection has 3 ♀ and 1 ♂ from Seattle, Washington, determined as *albibarbis* Big., but they come very close to *incisa* Lw. and are, I believe really referable to that species. C. F. Adams (1904: 441), recognizes *albibarbis* Big. in the following note. "A male specimen from Seattle, Wash.,

agrees with the female except that the coxae, femora largely, and scutellum are black; the abdomen is yellow, a small spot on first, third, fourth and fifth segments, and sixth and seventh, except sides, black. A female from the same source has the anterior coxae largely, and the two posterior pair at base, black, the front femora with an indistinct, subapical band, and the hind pair with the distal half brown."

I have seen a number of specimens that might be referred to Bigot's *albibarbis* but I hesitate at the present time to place them here or to describe them as new. Of these, one male and four females from Seattle, Washington, are in the collection of Mr. C. W. Johnson and are determined as *albibarbis* Bigot, but I am inclined to refer them to *incisa* Lw. In the collection of the University of Washington is one male and one female, from Snoqualmie, 1892, labelled as this species. In the Washington State College collection is a female from "Wash" labelled *albibarbis* from the O. S. Westcott collection and a female, Seattle, (C. V. Piper).

Rhagio albicornis Say

1823. *Leptis albicornis* Say, Jour. Acad. Nat. Sci. Phila., III, p. 38. 9.

1908. *Rhagio albicornis* Kertész, Cat. Dip., III, p. 302.

Brownish yellow; thorax with three broad brownish stripes, narrowly separated; abdomen with a large, rounded brownish spot on each segment; legs yellowish; tarsi dusky; wings hyaline, most of the veins and tip bordered with brownish; stigma brown.

Male.—Length, 9 to 10 mm. Head: Face brownish; light gray pollinose, sides and cheeks with pale hairs; proboscis and palpi yellowish or brownish yellow, the latter with pale and black hairs; antennae yellowish, arista dusky.

Thorax: Brownish yellow, subshining (except median stripe), dorsum with three broad stripes, narrowly separated, the lateral ones interrupted at the suture and not reaching the cephalic border; scutellum brownish yellow, apparently somewhat darker on disc, with rather short sparse black hairs; pleura brownish yellow; halteres yellowish; dorsum of thorax bare, with sparse short black hairs at front and on sides.

Abdomen: Brownish yellow, subshining, each segment with a large dark brown spot in center becoming pointed caudad on terminal half of abdomen; these spots do not reach caudal border of segments; lateral border of each segment also dark brown.

Legs: Coxae, femora and tibiae brownish yellow, the latter two slightly darker than the coxae; tarsi somewhat infuscated especially on apical segments; coxae with sparse pale hairs, femora and tibiae with short black hairs, more numerous on hind tibiae.

Wings: Veins brownish; most of the veins including several of the crossveins bordered with brown; stigma elongate, prominent, dark brown.

Female.—(Here described for the first time.) Length, 13 mm. Similar to the male with the following differences only: front and vertex are light gray pollinose, except a conspicuous stripe reaching nearly to eyes on either side and almost from frontal tubercle above to antennae below, and wider below than above which is shining black; frontal tubercle blackish.

Specimens Examined: 13; 9 males, 4 females.

PENNSYLVANIA:³⁵

NORTH CAROLINA: 1 ♂, 1 ♀, Havelock, Lake Ellis, May 7, 1906, (R. Woglum), [No. Car.].

SOUTH CAROLINA: 1 ♂, [in M. C. Z. labelled "Sea Is." (Mann), Ladies I. 9: 4: 1869, "Osten Sacken"].

GEORGIA: 1 ♂, "S. Ga." (Morrison), [U. S. N. M.]. St. Catherine Island, April 18, [U. S. N. M.].

FLORIDA: 1 ♂, 1 ♀, Atlantic Beach, near Jacksonville, (A. T. Slosson), [U. S. N. M.]; 3 ♂, 1 ♀, Atlantic Beach, (A. T. Slosson), [A. M. N. H., ex Slosson]. 1 ♂, Enterprise, March 30 to May 10, 1904 [A. M. N. H., ex Daecke].³⁶

MISSISSIPPI: 1 ♂, 1 ♀, Biloxi, Mar. 24, 1910, (F. M. Jones), [Pa. Dept. Agr., ex. Daecke].

In addition there is a male and a female in the collection of Mr. C. W. Johnson but I do not have a record of their locality.

***Rhagio boscii* Macquart**

1840. *Leptis boscii* Macquart, Dip. Exot., II, 1, p. 30.

1908. *Rhagio boscii* Kertész, Cat. Dipt. III, p. 303.

I have seen no specimens referable to this species nor, to my knowledge, has anyone else except Dr. T. W. Fyles on whose authority Winn & Beaulieu (1915: 123) include it in their list of the Diptera of Quebec. I have, however, been unable to examine the specimens in order to verify the determination. There are several specimens determined as this species by Loew in the Museum of Comparative Zoology in Cambridge but they are clearly *R. mystaceus*. A translation of the original description follows:

³⁵ Recorded from "Pennsylvania" by Wiedemann, Ausseur. Zwief. Ins., I, p. 223, (1828).

³⁶ Recorded from St. Augustine by Johnson (1913: 54).

"Ferruginous. Thorax black fasciate. Abdomen with black dorsal spots. Wing veins fuscous margined.

"Length about 7 mm. ♀. Palpi ferruginous. Face and front black. Antennae ferruginous; arista black. The black bands of the thorax almost contiguous; scutellum at base brown. Legs tawny; anterior legs of a whitish yellow; anterior tarsi blackish; intermediate and posterior brown, on the first segment a tawny brownish; halteres tawny. Wings a little yellowish; posterior border lightly edged with brown; longitudinal veins bordered with brown towards the tip; the transverse ones likewise bordered; stigma brown.

"From Carolina. Bosc. Museum.

"This species resembles *L. strigosa* Meigen."

Rhagio brunneipennis new species

Wholly dark brown, almost blackish, grayish pruinose; halteres brownish yellow; wings evenly suffused with brownish, slightly darker along veins; *eyes of male widely separated*.

Male.—Length, 6 to 6.5 mm. Head: Blackish in ground color, face, palpi, proboscis and frontal triangle gray pruinose, front brownish pruinose. Eyes separated about one and one-half times the width of the ocellar tubercle; all hairs black, sides of face very narrow, with fairly abundant hairs, which are also present on the cheeks, palpi and occiput, longer and more abundant on cheeks and palpi, several long hairs directed forward on ocellar tubercle, several on first two segments of antennae and a few short, fine hairs on either side of front.

Thorax: Blackish; mesonotum grayish pollinose with three broad almost black stripes, the two lateral ones reaching neither the cephalic nor caudal borders, with fairly long black hairs, more abundant on sides; pleura grayish pruinose, metapleural hairs blackish; scutellum grayish pollinose with fairly long black hairs; halteres brownish yellow.

Abdomen: Blackish, above and below grayish pollinose with short black hairs which are longer and more abundant on sides.

Legs: Coxae and femora blackish, hairs of former blackish; tibiae and tarsi dark brown, almost blackish.

Wings: Strongly suffused with brownish which is slightly darker along the costal border and often along some of the veins; stigma slightly darker than rest of membrane but not well defined.

Female.—Of same length and similar to male except that the front is about twice the width of the ocellar tubercle and the abdominal hairs are almost entirely lacking (this is probably due to rubbing); tibiae, except tip, slightly tinged with yellowish.

Holotype.—Male; Claremont, California, (Baker), [U. S. N. M., ex Aldrich, no. 24065].

Allotype.—Female; East Highlands, California, (F. R. Cole), Mar. 10, 1914, [F. R. Cole Colln.].

Paratypes.—Six males from Claremont, California, (Baker), two, nos. 1048 and 1089, Pomona College Collection, and three Cornell University, ex Aldrich Collection and ex Cole Collection; one F. R. Cole Collection; one from East Highlands, California, Mar. 10, 1904, F. R. Cole Collection.

Several of the males have the mesonotum rubbed so as to almost obscure the vittate appearance. The eyes of the males are separated as in *R. gracilis* Johnson and this species may therefore belong to a new genus but as in the case of *gracilis* I hesitate to erect a new genus to receive this species which would be based solely on a male character.

Rhagio californicus new species

Blackish; head and thorax light gray pollinose; hairs on thorax black, whitish on abdomen; femora mostly yellowish, tibiae partly yellowish, legs otherwise blackish; wings clear, stigma not prominent; halteres yellowish; *eyes of male widely separated*.

Male.—Length 5 to 5.5 mm. Head: Blackish in ground color, front and face light gray pollinose; frontal triangle, antennae, palpi and proboscis blackish; eyes of male separated by about the width of the ocellar tubercle. Sides of face very narrow with a few pale hairs, long pale hairs on palpi and cheeks, a few black hairs on first two segments of antennae, longer on the first; ocellar tubercle with several long black hairs directed forward; occiput above and along face inside border of each eye with a row of short black hairs and behind these several scattered ones.

Thorax: Blackish; mesonotum gray pollinose, laterally margined and medianly faintly trivittate, with somewhat lighter pruinosity, with rather sparse and rather long black hairs; scutellum similar to pronotum (but not vittate); pleura gray pollinose, metapleural hairs pale; halteres yellowish, extreme tip slightly infuscated.

Abdomen: Blackish, shining, above and below densely clothed with rather long yellowish hairs slightly appressed.

Legs: Coxae blackish, grayish pollinose, hairs long and pale; femora yellowish, the front pair slightly tinged with brownish on outer and inner surface and the hind pair along the upper half; tibiae dirty yellow, especially hind pair; tarsi dusky, middle metatarsus somewhat yellowish.

Wings: Membrane very faintly tinged with grayish which is a little more distinct on apex; veins dark brownish; stigma light brownish, elongate, rather diffuse.

Female.—Length, 5 mm. Similar to male except as follows: Front a little wider—about one and one-half the width of ocellar tubercle; mesonotum somewhat rubbed so that the vittae are not distinguishable; hairs on abdomen a little shorter and not quite so numerous; legs (present on one side only) with front femur blackish except base, hind one brownish on upper surface near apex, front tibia dark brownish on apical two-thirds and the tarsus wholly so; remaining tibiae and tarsi about as in male; wings seem to be a little larger.

Holotype.—Male; Berkeley Hills, Alameda County, California, Apr. 20, 1908, (E. T. Cresson, Jr.), [Acad. Nat. Sci. Phila., no. 6371].

Allotype.—Female; Berkeley, California, May 16, 1915, [M. C. Van Duzee, and returned to him].

Paratypes.—1 ♂; Felton, Santa Cruz Mountains, May 15–19, 1907, alt. 300–500 ft. (J. C. Bradley). 1 ♂; Berkeley, Cal., May 16, 1915, (M. C. Van Duzee), [both in Cornell Univ., Type no. 583. 1–2]. 1 ♂; Santa Cruz Mountains, May 1, 1910, (W. M. Mann), [A. L. Melander]. 1 ♀; Redwood City, April 25, 1906, [U. S. N. M., ex Aldrich].

The hairs on the frontal tubercle of the Felton paratype are broken off and the middle legs and one hind leg are missing; the remaining legs as in holotype; mesonotum as in allotype.

Because of the dichoptic eyes of the male, this may belong to a new genus. See, however, discussion under *R. brunneipennis* n. sp. and *R. gracilis* Johnson.

***Rhagio concavus* new species**

Similar to *R. incisus* Loew but the third antennal segment with the arista arising from near the ventral edge, the segment in profile concave above the arista; the black on first and second abdominal segments more nearly a spot than a band; the wings more distinctly clouded at the apex and the stigmal spot very distinct, dark brown.

Male.—Length, 8 to 10 mm. Similar apparently in every way to *R. incisus* Loew except as follows: Head: Antennae with third segment extending cephalad ventrad, the arista arising from the most cephalic point, the segment distinctly concave above the arista, especially noticeable when viewed in profile and a little from the front; inside and toward the front, the segment is hollowed out and the arista is furthermore situated towards the outside of the segment; at the apex of the concavity are several small black stiff hairs; these are also present on the upper surface in *R. incisus* but are not quite so long.

Legs: With more blackish than in most specimens of *incisus*, the femora wholly blackish except apex of fore and middle pairs and the hind tibiae distinctly blackened at apex.

Female.—Length 7–10 mm. Similar to the male except, of course, for the front which is the same as in the female of *incisus*.

Holotype.—Male; Mountains near Moscow, Idaho, collected by R. C. Shannon, July 25, 1920, [Cornell University Colln., Type no. 581].

Allotype.—Female; as above but collected on June 25, 1920.

Paratypes as follows: IDAHO: 13 ♂, 4 ♀, Mountains near Moscow, July 25, 1920 and 3 ♂, July 23, 1920 (R. C. Shannon), [C. U. Type Nos. 581. 1-8 (4 ♂, 4 ♀) and Shannon]. 1 ♀, Mount Moscow, June 24, (J. M. Aldrich), [U. S. N. M., Cat. no. 24066]; 1 ♂, 1 ♀, July 6, 1912, 2 ♂, July 5, 6, 1912 and 1 ♀, July 4, 1915, Moscow Mount, (A. L. Melander), [C. U.]. 1 ♀, Moscow, (J. M. Aldrich), [U. S. N. M., ex. Aldrich]. 1 ♂, Boville, July 15, 1910, [U. S. N. M., ex. Aldrich]. 1 ♀, Viola, [U. S. N. M., ex. Aldrich]. CALIFORNIA: 1 ♀, Mount Bradley, Siskiyou, June 18, 1920, (C. L. Fox), [Cal. Acad. Sci.].

Specimens also examined from:

BRITISH COLUMBIA: 2 ♂, Mount Cheam, August, 1907, (R. S. Sherman), [R. S. Sherman].

WASHINGTON: 1 ♀, Forks, Clallam County, July 4, 1920, (E. C. Van Dyke), [Cal. Acad. Sci.].

Very close to *R. incisus* Loew but can be separated at once by the shape of the third antennal segment, the more prominent stigmal spot and the darker femora. The ♀ from Forks, Clallan County, Washington, has the legs much paler than usual and the stigmal spot quite pale but is undoubtedly referable to this species.

***Rhagio costatus* Loew** (Pl. I. fig. 5; pl. II. fig. 12)

1862. *Leptis costata* Loew, Berl. Ent. Zeits. VI, p. 187.

1908. *Rhagio costatus* Kertész, Cat. Dip. III, p. 304.

Brownish yellow; thorax with three, more or less well defined, broad, brownish stripes, narrowly separated; abdomen with a somewhat elongate brownish to blackish spot on each segment above; legs somewhat variable, brownish yellow to fuscous, the hind pair usually darker than the first two; wings slightly cloudy, on costal margin brownish yellow; stigma pale brownish.

Male.—Length, 12 to 14 mm. Head. Face brownish pollinose, sides with pale hairs; palpi and proboscis brownish yellow, the former with moderately long pale hairs; antennae brownish yellow, the arista fuscous.

Thorax: Brownish yellow except three very broad fuscous stripes above, the middle one of which is often narrowly divided and in some individuals is darker and more pronounced than in others; pleura on lower half and a more or less distinct spot at base of scutellum darker. Thorax with sparse short black hairs, more numerous and longer on lateral and caudal borders and on scutellum. Halteres yellowish, knobs sometimes somewhat infuscated.

Abdomen: Brownish yellow, each segment with a dark brownish or fuscous elon-

gate spot, usually broader behind, on median line and a triangular one on either side on lateral border; with rather short fairly numerous black hairs, on sides becoming longer, thicker and pale.

Legs: Brownish yellow; middle and hind coxae more or less brownish, front and middle femora on apical half, and posterior femora and tibiae usually more or less infuscated; tarsi fuscous.

Wings: Membrane wholly faintly suffused with pale brownish; veins brownish; cells on costal border strongly tinged with brownish yellow; stigma elongate and slightly darker.

Female.—Length, 14 mm. Similar to male with the following exceptions: Front light brown pollinose; in ground color and markings generally somewhat paler; thoracic markings almost obsolete; lower half of pleura not brownish; abdominal markings less distinct; legs, except tarsi, almost uniform brownish yellow.

Specimens Examined: About 41 males and females.

WASHINGTON: 1 ♂, 1 ♀, Seattle, [Univ. Wash.].

OREGON: 1 ♂, Corvallis, April 24, 1897, [U. S. N. M.]; 1 ♀, Corvallis, June 5, 1897, [U. S. N. M.].³⁷

CALIFORNIA: 2 ♂, 3 ♀, Mesa Grande, Sonoma County, June 1908, (J. P. Baumberger), [A. N. S. P.]. 5 ♂, 2 ♀, Marin County, [A. M. N. H., "Hy. Edwards, no. 656"]; 1 ♀, Marin County, (E. C. Van Dyke), [U. S. N. M.]. 2 ♂, 3 ♀, Sonoma County, [Brooklyn Mus., Acc. no. 11941]. 2 ♂, Inverness, May 23, 1910, (E. C. Van Dyke), [U. of Cal.]. 1 ♀, Napa County, (E. C. Van Dyke), [U. of Cal.]. 1 ♂ Lagunita, [A. M. N. H., "Hy. Edwards, 656"]. 1 ♂, Baron; 1 ♂, 1 ♀, Lake County; 1 ♂, Sausalito, May 13, (J. C. Thompson); 1 ♀, Fieldbrook, May 29, 1903, (H. S. Barber); 1 ♂, Humboldt County, (E. C. Van Dyke), all U. S. N. M.]. 8 ♂, Muir Woods and Berkeley, May 18, 19, 28, [M. C. Van Duzee]. 1 ♂, Muir Woods, Marvin County, May 21, 1916, (M. C. Van Duzee), [A. N. S. P.].

This is one of the largest species of the genus. It may be readily distinguished by its large size, the abdominal markings and the strong yellowish tinge on the costal border of the wings. It is apparently not uncommon in California.

A male received from F. R. Cole, without a locality label but presumably from California has the abdominal spots produced on either side as broad blackish bands reaching across the base of each segment. It is undoubtedly referable to this species however.

Rhagio costatus var. *limbatus* new variety

Similar in size, general habitus and color markings to *R. costatus* Loew except that the wings are distinctly bordered with pale brownish not only on the costal border but most all of the veins are more or less distinctly edged with the same color. This is usually especially noticeable in the region of the base of the discal cell.

³⁷ Also recorded from Forest Grove and Newport by Cole and Lovett (1921: 236).

Holotype.—Male; Fieldbrook, California, May 19, 1903, (H. S. Barber), [U. S. N. M., no. 24064].

Allotype.—Female; Fieldbrook, California, May 29, 1903, (H. S. Barber), [U. S. N. M., no. 24064].

Paratypes.—2 ♂, 1 ♀, May 3, 1903, 1 ♂, May 29, 1903 and 1 ♀, May 19, 1903, Fieldbrook, California, (H. S. Barber), [U. S. N. M.]. 1 ♂, Blair's Rock, Redwood Creek, Humboldt County, California, June 12, [U. S. N. M.].

Rhagio dimidiatus Loew

1863. *Leptis dimidiata* Loew, Berl. Ent. Zeitschr., VII, p. 10, no. 17.

1908. *Rhagio dimidiatus* Kertész, Cat. Dip., III, p. 304.

Although I have seen Loew's types and several specimens referred to this species by Cole, Johnson and others I have been unable as yet to adequately define the species. Although it has been included in the key, more material will be necessary before properly diagnosing it. It is a western species.

Type series.—3 males two of which are labelled "Sitka, Sahlb" of which one is labelled "dimidiata, m." in Loew's hand; the third is labelled "Vanc."

Rhagio flavoniger Coquillett

1904. *Leptis flavoniger* Coquillett, Invert. Pac., I, p. 320.

1908. *Rhagio flavoniger* Kertész, Cat. Dip., III, p. 305.

Blackish, subshining; thorax with two median stripes and the lateral margins grayish; abdomen brownish yellow, segments four and five with a blackish spot on each side, those caudad almost wholly blackish; legs almost black, tibiae yellowish to brownish yellow; wings somewhat tinged with brownish, stigma pale brownish.

Female.—Length, 7 mm. Type redescribed. Head: Front brownish, more or less gray pollinose, especially just above the antennae, almost three times the width of the ocellar tubercle; face light gray pollinose, the sides with short sparse pale hairs; palpi blackish, somewhat grayish pollinose and with moderately long black hairs; proboscis dark brownish with fine hairs which appear somewhat pale especially in certain lights; antennae blackish, more or less gray pollinose; hairs on cheeks pale, above on occiput shorter, stiff and black.

Thorax: Mesonotum blackish subshining, more or less wholly grayish pollinose but with two narrow median stripes and the lateral margins broadly light gray

pollinose; humeri brownish yellow; the whole with short sparse black hairs which become longer and somewhat more numerous on the lateral margins; scutellum blackish, somewhat grayish pollinose, brownish yellow on caudal margin and with rather long blackish hairs; pleura blackish mostly light gray pollinose, a tuft of fine pale hairs just above front coxae and of black, longer ones just in front of halteres; metanotum blackish, subshining, lightly grayish pollinose; halteres pale yellow.

Abdomen: Brownish yellow, subshining, segments four and five with a large black spot on each side at base, seventh blackish, except caudal border, eighth wholly blackish; hairs fairly abundant, black, longer and more erect on sides.

Legs: Coxae black, gray pollinose, hairs pale; femora dark brown, almost black, front and middle pairs narrowly yellowish at apex. Tibiae dirty yellowish, the front pair distinctly brownish at apex, the hind pair strongly tinged with brown towards apex, inner surface, however, almost wholly paler; tarsi brownish, somewhat darker towards apex.

Wings: Veins dark brownish, towards base of wing somewhat paler; membrane uniformly faintly tinged with pale brownish; the stigma elongate, pale brownish.

Male.—Unknown.

Type.—Known only from the single type female, Ormsby County, Nevada, July 6, C. F. Baker collector, [U. S. N. M., type no. 6708].

This species seems to be near *R. dimidiatus* Loew of which it may be merely a pale female. It has not been recognized since it was described and until additional material is obtained showing its variations it will have to be retained as a distinct species.

***Rhagio gracilis* Johnson**

1912. *Leptis gracilis* Johnson, Psyche, XIX, p. 3.

Yellowish; abdomen slender, banded with black; legs long and slender; *eyes of male widely separated; anal cell closed and petiolate*.

Male.—Length, 6 mm. Head: Eyes almost as widely separated as in female—about one and one-half times the width of the ocellar tubercle; above the antennae are two fairly well defined tubercles; front, ocellar tubercle, and face blackish, light gray pollinose; palpi, and proboscis yellowish, face on sides and palpi with sparse pale hairs; antennae yellowish, arista black.

Thorax: Mesonotum yellowish, the whole disc tinged more or less with brownish and with several fine more or less definite darker lines due chiefly to rows of fine black hairs; pleura pale yellowish, more or less light gray pollinose; black hairs somewhat longer and more numerous on sides of mesonotum, and on scutellum which is dirty yellow in color; halteres pale yellowish.

Abdomen: Slender, yellowish, each segment with a broad black basal band except first which has a black spot below scutellum; clothed with short pale hairs on the yellow parts, with black ones on the black bands, longer on lateral margin.

Legs: Pale yellow; tarsi slightly infuscated, a black spot on underside at tip of trochanters.

Wings: Membrane hyaline; veins pale brownish; stigmal spot obsolete; anal cell closed before the margin, the petiole often one-half as long as the distance between the fork of Cu and the petiole.

Female.—Length, 6 mm. Like the male except as follows: Front slightly wider—about twice width of ocellar tubercle; frontal tubercles above antennae less prominent; first abdominal segment sometimes with a complete basal black band.

Specimens Examined: 29; 13 males, 16 females.

MAINE: 2 ♀, Bar Harbor, July 22 and 30, 1919, [B. S. N. H.; but there are additional specimens in that collection].³⁸

NEW HAMPSHIRE: 1 ♀, Mount Washington, 3000 ft. July 28, [B. S. N. H.]. 1 ♂, 1 ♀, White Mountain, July 1874, (Osten Sacken), [M. C. Z.]. 1 ♂, 3 ♀, Franconia, (A. T. Slosson), [U. S. N. M.]. 1 ♀, White Mountains, (Morrison), [U. S. N. M.]. 2 ♂, Glen House, July 23 and 26, 1915, [B. S. N. H.].

VERMONT: 1 ♂, 1 ♀, Amsden, July 10, 1908, [B. S. N. H.]. 2 ♂, Mount Ascutney July 11, 1908, [B. S. N. H.].

MASSACHUSETTS: 1 ♂, Mount Greylock, August 8, 1907, [B. S. N. H.]. 1 ♀, Chester, August 7, 1912.

NEW YORK: 1 ♂, Dug Mountain, August, (D. B. Young), [N. Y. S. M.]. 1 ♂, Upper Ausable, July 30, 1920, (J. Bequaert), [A. M. N. H.]. 1 ♂, Trenton Falls, July 1874, (Osten Sacken), [M. C. Z.]. 1 ♀, Wells, Aug. 6, 1918, (D. B. Young), [N. Y. S. M.]. 1 ♂, Newport, July 7, 1907, (D. B. Young), [N. Y. S. M.]. 1 ♀, Speculator, August 10, 1909, (D. B. Young), [N. Y. S. M.]. 1 ♂, 1 ♀, Colden, August 13, 1913, (M. C. Van Duzee), [Van Duzee]. 1 ♀, Olean, August 5, (M. C. Van Duzee), [Van Duzee]. 1 ♀, Dayton, June 29, (M. C. Van Duzee), [Van Duzee]. 1 ♂, Rock City, July 1, 1916, [C. U.].

This interesting species should probably form the type of a new genus because of the widely separated eyes in the male. Although no such condition exists in any other known genus of the subfamily Rhagioninae I hesitate to erect a genus based on a character of the male alone. The closed and petiolate anal cell alone in both sexes would be striking enough to remove this species from the genus *Rhagio* since an open anal cell has heretofore been considered a generic character of *Rhagio*. Unfortunately however an examination of a large number of specimens of *Rhagio* often reveals the anal cell not only closed on the margin of the wing but sometimes (in *R. mystaceus* particularly) with a short petiole.

³⁸ Recorded by Johnson (1925: 105) from the "Lower Penobscot Area," and from Sueur de Monte Spring and Duck Brook, Mount Desert (1927: 180).

Rhagio hoodianus Bigot

1887. *Leptis hoodiana* Bigot, Bull. Soc. Zool. Fr., XII, p. 115.

1908. *Rhagio hoodianus* Kertész, Cat. Dip., III, p. 306.

I have been unable to refer any specimens definitely to this species. It apparently resembles both *R. incisus* Lw. and *R. vertebratus* Say in many respects. A translation of Bigot's description follows:

"Length, ♂, 8 mm., ♀, 9 mm.

" ♂. Antennae, proboscis, face white pilose, black; palpi fuscous, white-haired; beard white; thorax grayish, with three broad fuscous stripes, the median one double, scutellum dirty brownish yellow, with short fuscous hairs; halteres pale yellow; coxae obscure fuscous; abdomen black, on each side with pale yellow hairs, the segments at the base broadly black; legs brownish yellow. Anterior femora with a broad black band, anterior tarsi fuscous, posterior femora at apex broadly, posterior tibiae and tarsi infuscate; wings pale grayish, on the outside and the veins darker, stigmal spot diffuse, fuscous.

" ♀. Similar; front broad, grayish yellow.

" ♂. Antennae, face, proboscis and palpi blackish, the last as well as the face with white hairs; beard white; thorax grayish with three broad black stripes, the intermediate one appears to be double, scutellum of an obscure yellowish; pleura as well as the coxae black; halteres a very pale brownish yellow; thorax and scutellum with some grayish hairs; abdomen a pale tawny, moderately hairy, except on the sides clothed with yellowish hairs, first segment black at the base, second and third with a broad black sinuous basal band, the following black with a yellowish border; legs a pale tawny, with fine hairs, somewhat black at the base of the femora, the anterior with a broad ring, the posterior tibiae and all the tarsi tinged with brownish; wings a pale grayish, deeper on the outside border as well as along the veins, stigmal spot narrow, diffuse brown.

" ♀. Resembles the ♂; the front broad, of a yellowish gray.

"North America, Mount Hood, 5 ♂, 1 ♀."

There is a male from Franconia, New Hampshire, in the American Museum of Natural History, ex. Slosson Collection, determined for Mrs. Slosson by Coquillett as this species. It agrees perfectly with several males from Franconia and Mt. Washington, New Hampshire, in the Slosson Collection which Coquillett determined as *hirtus* Lw. (equals *vertebratus* Say). I can see no reason for Coquillett's determination of the one specimen as *hoodiana*. The abdominal markings are typical of *vertebratus* and differ from Bigot's description of *hoodiana*.

Rhagio incisus Loew (Pl. II, fig. 14)

1872. *Leptis incisus* Loew, Berl. Ent. Zeits., xvi, p. 59.

1908. *Rhagio incisus* Kertész, Cat. Dipt. III, p. 306.

Blackish; thorax more or less distinctly trivittate; abdomen with caudal border of segments narrowly margined with brownish yellow or this paler band more or less expanded cephalad on the sides; legs yellowish brown, femora and tarsi more or less brownish or blackish; wings suffused with brownish, stigma elongate, brownish.

Male.—(Here described for the first time). Length 8 to 10 mm. Head: Face, frontal triangle, palpi, proboscis and antennae, including arista, blackish; sides of face, the proboscis and palpi with long pale hairs, the latter often with black ones or the two intermixed; face and frontal triangle light gray pollinose, but often rubbed.

Thorax: Blackish; in specimens not rubbed humeri and mesonotum light gray pollinose, the latter with three more or less well defined broad darker stripes, the middle, one narrowly divided; scutellum dark brownish; mesonotum and scutellum rather densely clothed with rather long black hairs; halteres yellowish.

Abdomen: Blackish, subshining, with caudal margin of each segment, except first and last, narrowly brownish yellow, but in some specimens the lighter band is extended cephalad on each side so that it appears to be deeply notched in the middle by the black portion; vestiture consists of long dense pale hairs on sides and somewhat more sparse and shorter pale hairs on disc interspersed with a few black ones.

Legs: Coxae blackish, more or less light gray pollinose, the anterior and middle pairs with dense long pale hairs, the posterior only on lower half; legs yellowish brown with dark brown or blackish markings somewhat variable but usually as follows: A broad band on middle of front femora, a narrower one on middle pair and hind pair except base and sometimes the tip; tip of metatarsi and remainder of tarsi blackish.

Wings: Membrane evenly lightly suffused with brownish, more distinct on costal border; veins dark brown; stigma elongate, brown, not especially prominent (Pl. II, fig. 14).

Female.—Length, 7 to 9 mm. Similar to male with the following exceptions: In general slightly paler; front a somewhat satiny brown; pile of palpi usually blackish, palpi, proboscis and antennae more of a dark brown; coxae sometimes somewhat brownish in ground color rather than blackish, and in a few specimens the femora and tarsi almost lacking in the darker brown markings.

Type.—Female; California, (H. Edwards) in the Museum of Comparative Zoology.

Specimens Examined: About 89 males and females.

ALASKA: 1 ♀, Juneau, July 26, 1899, (T. Kincaid), [U. S. N. M.; det. as *dimidiatus* by Coquillett].

BRITISH COLUMBIA: 2 ♀, Bundy Bay, June 3, 1916, [R. S. Sherman].

MEM. AM. ENT. SOC., 7.

WASHINGTON: 1 ♂, Paradise Valley, Mount Rainier, July 11, 1915, [Leonard]. 1 ♀, Keyport, July 1905, (R. W. Doane), [Cole; doubtfully as *incisus*]. 1 ♂, 4 ♀, Seattle, [B. S. N. H.; as *albibarbis* but probably *incisus*]. 2 ♂ [Johnson].

OREGON: 1 ♂, Hood River, June 24, 1917 and 1 ♂, May 16, 1917, (F. R. Cole), [Cole]. 1 ♀, Detroit, [U. S. N. M.].

IDAHO: 1 ♂, Cascade, May 22, [A. M. N. H., ex Bequaert]. 1 ♂, Avon, July 26, 1912, [A. L. Melander; the black abdominal and palpal hairs are more like *concausus*]. 1 ♂, Craig's Mountain, [A. M. N. H., ex Williston]; 2 ♂, [Johnson].

CALIFORNIA: 1 ♂, Berkeley Hills, Alameda Co., March 8, 1908; 1 ♂, April 11, 1908; 1 ♀, April 20, 1908, (E. T. Cresson Jr.), [A. N. S. P.]. 3 ♂, Pacific Grove, March 21, 2 ♂, March 23 and April 1, 1904, [Stanford, lot 132]; 2 ♂, 2 ♀, May 8-10, 1906, [U. S. N. M., ex Aldrich]; 1 ♂, 1 ♀, June, (Wm. H. Mann), [Mann]. 2 ♀, Berkeley, May 7, [Van Duzee]. 1 ♂, March 26, 1897, [A. M. N. H., ex Wheeler]. 2 ♂, April 22, 1919, (E. C. Van Dyke), [Cal. A. S.]. A series of males and females, Palo Alto, March 25 to May 13, [Cole]; 3 ♂, March 25, [A. M. N. H., ex Wheeler; "L. S. Jr. U., Lot 43"]; 2 ♂, 2 ♀, March 20-22 [U. S. N. M., ex Aldrich]. 1 ♀, Mesa Grande, Sonoma County, June 1908, (J. P. Baumberger), [A. N. S. P.]; 2 ♀, Sonoma Co., [Brook. Mus., Acc. no. 11941]. 3 ♂, Santa Clara Co., (C. F. Baker), [Stanford U.]. 2 ♂, Stanford University, March 24, 1906, [U. S. N. M., ex Aldrich]; 1 ♂, April 11, 1906, [Melander]. 1 ♂, San Raphael, May 10, (Osten Sacken?), [A. M. N. H.; labelled "*Leptis incisus* 'O S'"]. 7 ♂, 6 ♀, San Jose, April 2 to 4, 1903; 1 ♀, April 30, 1895; 1 ♂, April 3, 1897, [Stanford U.], 1 ♂, Santa Cruz Mountains, May 17, 1896, [Stanford U., Lot 121]. 2 ♂, 1 ♀, Carmel, Monterey County, May 24, 1919, (E. P. Van Duzee), [A. N. S. P.]. 1 ♀, Keene Camp, Riverside County, June 6 to 12, 1917, (E. P. Van Duzee), [A. N. S. P.]. 1 ♀, Mount Wilson, June 5, 1909, (F. Grinnell, Jr.), [U. S. N. M., ex Aldrich]. 1 ♀, Shasta Springs, June 5, 1920, (C. L. Fox), [Cal. A. S.]. Byrson, Monterey Co., May 18, 1920, (E. P. Van Duzee), [Cal. A. S.]. 1 ♂, Pleyto, May 22, 1920, (E. P. Van Duzee), [Cal. A. S.]. 1 ♀, El Dorado County, June 29, 1916, (A. C. Browne), [Stanford U.]. 3 ♂, Santa Barbara County, [U. S. N. M.]. 2 ♂, 1 ♀, Santa Clara County, [U. S. N. M.]. 1 ♂, Alameda Co., [U. S. N. M.]. 1 ♀, [M. C. Z.; labelled in Loew's handwriting, "type, California, H. Edwards."].

NEW YORK: Binghamton, 1 ♂, [Dietz Colln.; may be *incisus* but the determination was probably in error].

NEW HAMPSHIRE: 1 ♀, Mount Washington, [A. M. N. H., ex A. T. Slosson].

This is apparently a fairly common species in California. I have seen a series upwards of forty males and females most of them loaned me by Mr. F. R. Cole who reports that he still retained a considerable series of both sexes taken by him from Palo Alto, California.

The blackish color of the body together with the characteristic abdominal bands are the chief distinguishing characters.

Of two females received from Mr. Cole for study, one from Keyport, Washington, has the coxae almost yellowish and the other, without a locality label, has the coxae but slightly tinged with

brownish; the stigma of both is very distinct. The antenna has the third segment somewhat resembling that of *concausus* n. sp. but it is not quite so distinctly concave above the arista. I believe, however, that these specimens are undoubtedly referable to *incisus*.

A male from Mount Washington, New Hampshire determined by Coquillett for Mrs. Slosson, now in the American Museum of Natural History ex Slosson Collection may be *incisus* but I am inclined to think it is *vertebratus* Say. The black bands of the abdomen are enlarged so that only the hind border of each segment is narrowly yellowish; the first segment, however, has a central spot just as in *vertebratus*; the leg markings and everything else agrees with *vertebratus*, the front and hind femora are blackish on apical half, hind tibiae darkened but more distinctly so towards tip.

The male from Avon, Idaho, in the Melander collection has black abdominal and palpal hairs much as in *concausus* n. sp. but I believe it is *incisus*.

I am now rather inclined to doubt the correctness of my record of *incisus* from Binghamton, New York, (Leonard, 1928: 759). I determined the specimen, a male, for Dr. W. G. Dietz several years ago and returned it to him. *R. incisus* is apparently only Western in range.

Rhagio intermedius Walker

1848. *Rhagio intermedia* Walker, List Dip. Brit. Mus., I, p. 212.

1904. *Leptis intermedia* Adams, Kans. Univ. Sci. Bul. II, p. 441.

1908. *Rhagio intermedius* Kertész, Cat. Dip., III, p. 306.

No workers have been able to identify this species since it was first described. Walker's original description follows:

"Mas. et. fem. Fulvus, thorace fusco trivittato, pectore flavo albido, abdomine fusco quadrimaculato apice obscuriore, pedibus fulvis, alis subfulvis.

"Allied to *R. tringarius* and to *R. immaculatus*. Body tawny; head paler beneath, clothed with tawny hairs; eyes brassy; palpi, lancets and sucker tawny, the former clothed with black hairs; feelers pale ferruginous; the bristle of the fourth joint piceous; chest tawny; thinly clothed with black hairs, and having three broad brownish stripes, which cease before they reach the scutellum; middle stripe very slightly divided; breast whitish yellow; abdomen tawny and clothed with black hairs; each of the segments from the first to the fourth with a brown spot on its back; following segments more dull; legs tawny, clothed with tawny down: feet dull ferruginous: wings with a slight tawny tinge, especially at the base and along the fore border; veins tawny; poisers pale, tawny. Length of the body 4-5 lines [about 8-10 mm.]; of the wings 9-10 lines.

"Var. β . Stripes on the chest very indistinct; abdomen without spots.

"Male like the female; breast grayish; abdomen darker towards the tip.

"a. St. Martin's Falls, Albany River, Hudson's Bay, Presented by G. Barnston Esq."

Rhagio limbipennis Bigot

1887. *Leptipalpus limbipennis* Bigot, Bul. Soc. Zool. Fr., XII, p. 106.

1905. *Leptis limbipennis* Aldrich, Cat. N. Am. Dipt., p. 214.

Originally described by Bigot from a single female specimen, the species has not since been recognized. I feel certain that it will eventually prove to be a synonym of some other already described species of *Rhagio*. A translation of Bigot's description follows:

"Length, 6.5 mm. ♀. Antennae palpi proboscis, pale fulvous, black haired; palpi small, bare; front black; face below obscure yellowish; thorax pale fulvous, tergum opaque black, sutures and two narrow lines tinged with pale fulvous, scutellum of the same color, black at base; abdomen fuscous black, segments broadly margined with pale fulvous; halteres testaceous; feet testaceous; tarsi infuscated at apex; wings pale dusky, paler in middle and at apex; the stripe broad, diffused, transverse, tinged with pale fuscous, spotted, stigmal spot oblong, fuscous.

"Antennae, palpi and labellum of a pale tawny, black-haired the palpi very small and bare; front above the face of a deep black, below yellowish; thorax pale fulvus with the tergum opaque black, the suture and two very narrow lines fulvous; scutellum pale fulvous, at base blackish; halteres testaceous; abdomen a brown-black with the posterior border of the segments broadly pale fulvous; feet testaceous, with the tip of the tarsi brown; wings a pale brownish, stigmal spot oblong, brown, anal all closed before the border.

"Rocky Mountains, North America. 1 specimen."

Rhagio maculifer Bigot

1887. *Leptis maculifera* Bigot, Bul. Soc. Zool. France, XII, p. 113.

1908. *Rhagio maculifer* Kertész, Cat. Dip., III, p. 308.

Blackish; abdomen reddish yellow, black on three terminal segments and with segments 2, 3 and 4 each with a prominent black spot; femora and tarsi mostly black, remainder of legs yellowish; stigma prominent, elongate, dark brown. Washington, Oregon.

Male.—Length 9 to 10 mm. Head: Face and cheeks blackish, light gray pollinose; proboscis and palpi blackish; cheeks, palpi and sides of the face with long white hairs; ocellar tubercle with black hairs; antennae blackish.

Thorax: Mesonotum blackish with indistinct light gray pollinose stripes on disc but with lateral border distinctly light gray pollinose; scutellum blackish, somewhat dusted with light gray pollen; both with fairly thick, rather long, blackish hairs; halteres pale yellowish; pleura blackish, light gray pollinose, pro- and metapleural hairs whitish.

Abdomen: Reddish yellow with following parts black; First segment at base and

on sides, a spot in the center of segments 2, 3 and 4 and terminal segments, except a more or less distinct band at base; hairs black on disc, whitish and longer on sides.

Legs: Coxae blackish, light gray pollinose with long white hairs; trochanters blackish; femora blackish, brownish yellow towards tip of first two pairs and base of third pair; tibiae brownish yellow, tip of hind pair blackish; tarsi blackish, except most of metatarsus which is brownish yellow.

Wings: Longer than abdomen; membrane uniformly somewhat clouded but slightly deeper towards tip; veins dark brown; stigmal spot elongate, dark brown, prominent.

Female.—Unknown.

BRITISH COLUMBIA: 1 ♂, Vancouver, June 2, 1914, (R. H. Chrystal). 1 ♂, Nicolum River, Hope, July 14, 1906, (R. S. Sherman). 1 ♂, North Westminister, June 18, 1909.

OREGON: Forest Grove, June 15, 1918, [Cole].

The above description has been drawn up from the four specimens listed above. They seem to agree well with Bigot's description. I have so far seen no other specimens referable with certainty to this species, except a male from Mount Rainier, Washington, August, 1895, (C. V. Piper), [Wash. State College].

Rhagio mystaceus Macquart (Pl. III. fig. 22)

1840. *Leptis mystacea* Macquart, Dip. Exot. II, p. 1.

1908. *Rhagio mystaceus* Kertész, Cat. Dip., III, p. 308.

Blackish; thorax trivittate; abdomen with yellowish brown bands on caudal border of each segment or the basal segments mostly yellowish brown with the black largely confined to a spot in the center of each and one on each lateral margin, the three areas often more or less connected along the cephalic border; legs blackish, front tibiae, except tip, whitish or yellowish and the middle tibiae which are usually brownish; wings with caudal border and two bands and tip brownish.

Male.—(This sex is here described, I believe, for the first time.) Length, 7 to 9 mm. Head: Face, ocellar tubercle and proboscis blackish, all except latter and frontal triangle distinctly light gray pollinose; palpi yellowish, slightly gray pollinose and together with sides of face densely clothed with long pale hairs intermixed usually with a few black ones; antennae blackish, second segment paler at tip.

Thorax: Mesonotum light gray pollinose with three broad brownish stripes, the middle one narrowly divided on the median line; scutellum often somewhat lighter and more or less gray pollinose; mesonotum and scutellum with moderately long and thick black hairs; pleura blackish, grayish pollinose; humeral calli light gray; halteres yellowish.

Abdomen: Blackish with a yellowish brown band on each segment which includes

merely the caudal border to as much as nearly the caudal half. Frequently this area is so extended especially on segments 2-4 as to leave in front only a median spot and a lateral one on each side of the black; these however are often connected on the cephalic border by black; vestiture consists of pale hairs, moderately thick on disc, becoming longer and more abundant on sides.

Legs: Somewhat variable in coloring; coxae blackish, light gray pollinose and with pale hairs; femora, blackish to dark brownish, the extreme tip of the front pair and most of upper surface of the middle pair usually always brownish; front tibiae, except tip, yellowish to almost whitish, middle pair light brown to dark and hind pair usually dark brownish; metatarsi except tip dark brownish, remainder and often hind metatarsus blackish.

Wings: Veins dark brown, costal cell and the tip broadly and the anal border narrowly and two bands, one from the stigma thru tip of discal cell, the other at base of discal cell, dark brownish, cubitus and anal cross-veins often infuscated; stigmal spot somewhat darker and prominent.

Female.—Length, 6 to 8 mm. Similar to male except that the front is brownish with a rather distinct median groove; the palpi are often blackish in ground color and gray pollinose; the abdomen often has less black than in the male.

Specimens Examined: About 594 males and females.

NEWFOUNDLAND: 4 ♂, St. Johns, June 20, 1906, [C. N. M.]. 1 ♂, 1 ♀, Stephenville, St. George Bay, July 12, (G. P. Englehardt), [Brook. Mus.]. 1 ♂, 1 ♀, Balena, June, 1903, (Wm. Palmer), [U. S. N. M.]. 1 ♂, 2 ♀, "Bay of N. Newfoundland," July, [Davis].

NEW BRUNSWICK: 1 ♂, Salisbury, June 15, 1914, (F. M. McKenzie), [N. B. Agr. Exp. Sta.]. 1 ♀, Chipman, July 30, 1915, (F. M. McKenzie), [N. B. Agr. Exp. Sta.]. 1 ♀, Fredricton, August 21, 1915, (A. B. Baird), [N. B. Agr. Exp. Sta.].

NOVA SCOTIA: 2 ♂, 1 ♀, Millsville, 1908, [C. U.]. 1 ♀, Shelburn, July 1, 1911, (Arthur Gibson), [C. N. M.]. 1 ♂, Bayington Passage, June 20, 1910, (A. Halkett), [C. N. M.].

QUEBEC: 1 ♂, 1 ♀, Montreal, May 28-31; 3 ♀, Lauzon, June 30 to July 4, 1909; 1 ♂, 1 ♀, Outremont, June 19, 1919; 1 ♂, 2 ♀, Mount Royal, June 12, 1919; 1 ♀, Joliett, July 10; 1 ♀, St. Remi, June 3, 1920, (all Ouellet), [all Ouellet].³⁹ 2 ♀, Meach Lake, June 21, 1916, (Arthur Gibson), [C. N. M.]; a third ♀ in C. U.]. 1 ♀, Aylmer, May 27, 1919, (J. McDunnough); 2 ♂, Queens Park, Aylmer, May & June, 1922, (C. B. Hutchings); 4 ♂, 7 ♀, Aylmer, May 15 to June 8, (C. B. Hutchins); 1 ♂, 1 ♀, Chelsea, June 7, 1919, (J. McDunnough); 1 ♀, Meach Lake, May 30, 1911, (C. H. Young); 1 ♀, Fort Coulonge, June 5, 1919, (J. I. Beaulne); 1 ♂, 1 ♀, Colebrook, June 20-21, 1914, (C. G. Hewitt); 3 ♂, 2 ♀, Megantic, June, 1923, (C. H. Curran); 2 ♂, Cascade, June 19, 1923, (R. Ozburn); 1 ♀, Caradoc?, June 1, 1920, (H. F. Hudson); 1 ♀, Fairy Lake, June 1, 1927 (W. J. Brown), [all C. N. M.].

ONTARIO: Jordan, June; 3 ♂, Blackburn, June 22, 1923, (R. Ozburn and A. Richardson); 1 ♂, Algonquin Park, June 1922, (J. McDunnough); 2 ♂, Point Pelee,

³⁹ Also recorded from Montreal and Rigaud by Winn and Beaulieu (1915: 123).

May 27, 1925, (G. S. Walley); 1 ♂, Miners' Bay, May 25, 1927, (F. P. Ide); 2 ♀, Norway Point, Lake of Bays, July 12, 1920, (J. McDunnough); 1 ♂, Ottawa, June 7, 1918, (G. B. Hutchins); 2 ♂, 1 ♀, Hog's Back, near Ottawa, June 11, 1908, (J. A. Letourneau); 2 ♂, Sudbury, May 26, and June 15, 1889; 1 ♀, Belleville; 2 ♀, Hastings, Evans County, June, (Glenn Ross); 2 ♂, Post Hope, May to June, (W. Metcalf), [all C. N. M.]. 1 ♀, Toronto, July 4, 1911, (M. C. Van Duzee), [Leonard]. 1 ♂, Grimsby, June 3, 1894, [U. S. N. M.]. 1 ♂, 1 ♀, Waubamic, June 8 and July 5, 1915, [U. S. N. M., ex Aldrich]. 4 ♂, Burlington, June, 1919; (H. C. Hockett), [Leonard]. 2 ♂, 2 ♀, Cedarhurst, June 13, 1913, (A. W. B.), [Ont. Agr. College].

MAINE: 2 ♂, 2 ♀, June 18, 1912, June 17, 1908, and July 7, 1908, [Maine A. E. S.]. 1 ♀, Capens, July 18, [Leonard, ex Johnson].⁴⁰

NEW HAMPSHIRE: 1 ♂, 1 ♀, "White Mts." (A. T. Slosson), [A. M. N. H.]; 1 ♂, 1 ♀, White Mountains, (Morrison), [U. S. N. M.]. 1 ♀, Mount Washington, (A. T. Slosson), [A. M. N. H.]. 3 ♀, Franconia, (A. T. Slosson), [A. M. N. H.]. 1 ♂, Hanover, (C. M. Weed), [U. S. N. M., ex Aldrich]. 1 ♂, Canobie Lake, (Geo. Dimmock), [U. S. N. M.].⁴¹

VERMONT: 1 ♂, Manchester, June 4, 1910, [M. D. Leonard, ex C. W. Johnson].⁴²

MASSACHUSETTS: 1 ♀, Blue Hills, June 3, 1916, [Brues]. 9 ♂, Petersham, June, (C. T. Brues, J. W. Chapman), [Brues]. 1 ♂, 1 ♀, Sherborn, June 11, 1916, (C. A. Frost), [Van Duzee]. 1 ♂, 2 ♀, Amherst, June 7 and May 30, 1904 and June 8, 1911, [Mass. Agr. College]. 1 ♂, Boston, [Brues]. 2 ♂, 2 ♀, Boston, [A. M. N. H.]; "Hy. Edwards, 648, 649". 2 ♂, 1 ♀, Wachusett Mountain, [A. M. N. H.]; "Hy. Edwards, 648". 1 ♀, Forest Hills, [A. M. N. H.]. 1 ♀, Beverley, June 30, 1875, (Ed. Burgess), [U. S. N. M.]. 1 ♂, Chicopee, May 31, 1896, [U. S. N. M.]. 1 ♀, Quincy, (J. C. Merritt), [U. S. N. M.]. 1 ♂, 2 ♀, Lexington, June 16, 18, 23, (N. Banks), [M. C. Z.]. 1 ♀, Cambridge, (Geo. Dimmock), [U. S. N. M.]. 2 ♀, Bass Rocks, June, [A. N. S. P., ex Dietz]. 12 ♂, 1 ♀, [Mass. Agr. College].⁴³

RHODE ISLAND: 2 ♂, June 23, 1907; 4 ♂, Cumberland, May 28, 1904, [all R. I. Agr. College].

CONNECTICUT: 1 ♂, New Haven, May 22, 1910, (W. E. Britton); 1 ♀, Branford, June 13, 1918, (B. W. Walden); 1 ♂, Storrs, June 1, 1927, (J. A. Manter); 1 ♂, June 2, 1924, (J. W. Blalock); 1 ♀, Stonington, June 6, 1914, (I. W. Davis), [all Conn. Agr. Exp. Sta.]. 1 ♂, New Haven, May 15, 1910, (A. B. Chaplain), [Pa. Dept. Agr.]. 1 ♀, Darien, June 11, 1912, [Leonard, ex Johnson].

NEW YORK: 1 ♂, Keeseville, June, 1916, (G. A. Jeffreys), [Biol. Surv.]. 1 ♂,

⁴⁰ Recorded by Johnson (1925: 105) from the following "Areas": Moosehead Lake, Lower Penobscot, Washington County, Mount Desert, Lower Kennebec, and Southwestern Maine.

⁴¹ Recorded from the White Mountains, Lake Winnepesaukee, Mount Monadnock, and Hampton "Areas" by Johnson (1925: 105).

⁴² Recorded by Johnson (1925: 105) from the Upper River Valley and Lower 'Green Mountains' "Areas."

⁴³ Also reported by Johnson (1925: 105) from the following "Areas": Berkshire, Connecticut River Valley, Boston, Cape Cod, Nantucket, and Bristol County.

Peru, June 10, 1916, [C. U.]; 2 ♂, June 8, 1916, (C. R. Crosby & W. T. M. Forbes), [C. U.]. 2 ♀, Loomis, [Brues]. 1 ♂, Hamburg, June 6, 1909, (M. C. Van Duzee), [Van Duzee]. 1 ♂, Hamburg, May 26, 1912, (M. C. Van Duzee), [Van Duzee]; 2 ♂, June 6, 1909, (M. C. Van Duzee), [Leonard]. 1 ♂, Holland, May 21, 1911, (M. C. Van Duzee), [Leonard]. 1 ♂, Woodworth's Lake, Fulton County, (C. P. Alexander), [C. U.]. 2 ♀, Fort Edward, June 7, 1916, [C. U.]. 2 ♂, 2 ♀, Rock City, June 6, 8, 9, 1915, [C. U.]. 1 ♂, Crosby, Yates County, May 23, 1918, (C. R. Crosby), [C. U.]. 1 ♀, North Elba, July, (F. Watson) [Staten Id. Mus.]. 4 ♀, West Point, June, [Brook. Mus.]. 1 ♀, West Point, June 4, 1916, (Wm. T. Davis), [Davis]. 3 ♂, 3 ♀, Big Indian Valley, Catskill Mountains, May and June, [A. M. N. H.]. 2 ♂, 1 ♀, Fort Montgomery, May 31, 1903, [Davis]. 1 ♂, 4 ♀, Trenton Falls, June 4 to 8, 1921 (M. D. Leonard), [C. U.]. 2 ♀, West Winfield, June 7, 1921, (M. D. Leonard), [C. U.]. 5 ♂, 1 ♀, Loon Lake, June 10 to 11, 1916, (C. R. Crosby), [C. U.]. 1 ♀, Staten Island, June 2, (Wm. T. Davis), [Davis]. Orient Point, June (Roy Latham), [N. Y. S. M.]. 3 ♂, 2 ♀, Staten Island, May 24 to June 3, [Davis]. 1 ♀, Watchogue, June 3, [Davis]. 1 ♀, the Roosevelt Estate, Oyster Bay, June 14, 1903, [Pa. Dept. Agr.]. 1 ♀, Jamaica, May 29, 1909, (C. E. Olsen), [A. M. N. H.]. 1 ♂, 1 ♀, Yaphank, May, [A. M. N. H.]; 1 ♂, 1 ♀, May 29, 1911, (C. L. Pollard), [Staten Id. Mus.]; 1 ♂, 1 ♀, May 18, 1913, (Wm. T. Davis), [Davis]; 1 ♀, May 29, [Brook. Mus.]. Cold Spring Harbor, June 21, 1917, (Wm. T. Davis), [Davis]. 2 ♀, May 26 and June 11, 1896, Flatbush, [A. M. N. H.]. 1 ♀, Flushing, May 25, 1918, (J. Bequaert), [A. M. N. H.]. 1 ♀, Central Park, Long Island, June 27, 1920, [A. M. N. H.]. 3 ♀, Sands Point, June 15, 1919 and July 10, 1920, [A. M. N. H.]. 1 ♀, Mix Creek Valley, Cattaraugus County, June 11, 1915, [C. U.]. 1 ♀, Oliverea, June 21, 1918, (Wm. T. Davis), [Davis]. 1 ♂, Onteora Mountain, Greene County, 2500 ft., (L. O. Howard), June, [U. S. N. M.]. 1 ♀, Ramapo, May 31, [Davis]. Lancaster, June, (M. C. Van Duzee), [Van Duzee]. Keene Valley, June; Saranac Inn, June; Speculator (D. B. Young), June; Lake Clear (D. B. Young), June; Newport (D. B. Young), May; Chapel Pond, (S. C. Bishop), June; Mt. McIntyre, 4,000 ft., (M. D. Leonard) June, 30; Johnstown, May; Trenton Falls, (D. B. Young, M. D. Leonard) July; Corinth, (D. B. Young), June; Albany, June; Thatcher Park, Helderberg Mountains, (M. D. Leonard), May; Cropseyville, (M. D. Leonard), June; Poughkeepsie, (D. B. Young), May; Wappinger's Falls, (M. D. Leonard), July, [all N. Y. S. M.]. Many from several locations in Tompkins County, including Ithaca, Coy Glen, McLean Bogs, Ringwood, Spencer, and Danby, May 27-July 31, 1882-1925, [mostly in C. U.].⁴⁴

NEW JERSEY: 1 ♀, Malaga, June 1, 1907, [A. N. S. P.]. 1 ♂, Ashland, May 13, 1905, [A. N. S. P.]. 2 ♂, Pemberton, October 10, 1908, [A. N. S. P.]. 2 ♂, Merchantville, May 25, 1902, and June 4, 1904, (E. Daecke); 1 ♂, Iona, May 10, 1908; 1 ♀, May 23, 1904, (E. Daecke); 2 ♀, Manumuskin, May 10, 1903, (E. Daecke); 2 ♂, 1 ♀, National Park, May 20, 1905, (E. Daecke); 1 ♂, Brown's Mill Junction, May 21, 1904, (E. Daecke); 1 ♀, Da Costa, May 18, 1902, (E. Daecke); [all Pa. Dept. Agr.]. 1 ♂, 1 ♀, Anglesea, May 27, 1905, (F. Haimbach), [A. N. S. P., ex Haimbach]. 2 ♀, Gloucester County, June 10, 1906, (F. Haimbach), [A. N. S. P.,

⁴⁴ Recorded from Axton by MacGillivray and Houghton (1903: 12-13).

ex Haimbach]. 1 ♀, Riverton, July 16, [A. N. S. P.]. 1 ♂, 2 ♀, Milltown, June 10, [A. M. N. H.]. 1 ♂, Newfoundland, May 17, 1910, and pair in coitu May 1899, (Wm. T. Davis), [Davis]; 1 ♂, 1 ♀, May 30, [A. M. N. H.]; 1 ♂, [Brook. Mus.]. 1 ♂, 1 ♀, Hackettstown, May 22, 1910; Lake Hopatcong, May 24, 1910; 2 ♀, Orange Mountains, May and June; 2 ♂, Hemlock Falls, May and June; 10 ♂, 9 ♀, Great Piece Meadow; 4 ♂, 2 ♀, May 30, 1919, (J. Bequaert), [all A. M. N. H.]. 4 ♂, 1 ♀, Trenton, May 31, 1906 [A. N. S. P.]. 1 ♂, Ocean County, [Brook. Mus.]. 1 ♂, Essex Falls, June 8, 1910, [Brook. Mus.]. 1 ♀, Long Branch, June 11, [Brook. Mus.]. 1 ♀, Ramsey, June 16; 5 ♂, 2 ♀, June 5 to 10, 1916, (J. Bequaert), [A. M. N. H.]. 1 ♀, May 16, (R. P. Dow), & 7 ♂, Lahaway, [A. M. N. H.]. 1 ♂, Englewood, April 28, 1919, (J. Bequaert), [A. M. N. H.]. 3 ♀, Lakehurst, May 16, 20, 24; 1 ♂, May 30, 1912; 1 ♂, 3 ♀, May 13-30, (Wm. T. Davis), [Davis]. 1 ♂, 1 ♀, Clementon, May 30, 1895, [U. of Ill.]; 1 ♂, May 24, [A. N. S. P.]. 3 ♂, Moorestown, June 21, 1924, (H. C. Hallock), [C. U.].

PENNSYLVANIA: 2 ♀, June 16, 1907; 2 ♀, June 4, 1905; June 3, 1906, Swarthmore, (E. T. Cresson Jr.), [A. N. S. P.]. 1 ♀, June 3, 1917; 2 ♂, June 7, 1912; ♀, June 5, 1912, Hummelstown, (J. N. Knull), [Pa. Dept. Agr.]. 1 ♀, Glenside, Montgomery County, June 23, 1907, [A. N. S. P.]. 1 ♂, Hekton Mills, May 13, 1910, (W. R. Walton), [Pa. Dept. Agr.]. 4 ♂, Paxtang, May 26, 1918, (C. S. Anderson), [Anderson]. ♂, Churchtown, May 21, 1916, (C. S. Anderson), [Anderson]. 3 ♀, Castle Rock, Delaware County, May 28, June 6, 9 [A. N. S. P.]. 2 ♀, Harrisburg, May 27, 1916, (C. S. Anderson), [Anderson]. 1 ♂, 2 ♀, Germantown, May 20, June 25, [A. N. S. P.]. 1 ♂, 1 ♀, Jeanette, (J. M. Aldrich), [U. S. N. M., ex Aldrich]. 1 ♂, 2 ♀, Montgomery County, May 26, June 29, [A. N. S. P.]. 2 ♀, Washington County, (Ehrmann), [U. S. N. M., ex Aldrich]. 1 ♀, Upsala, June 2, 1906, [A. N. S. P.]. 1 ♀, North East, May 26, 1916, (R. A. Cushman), [U. S. N. M., Div. Forest Ins.]. 1 ♂, 1 ♀, Hazelton, June, (W. G. Dietz), [A. N. S. P., ex Dietz]. 1 ♀, Inglenook, May 25, 1913, (E. Daecke), [Pa. Dept. Agr.]. 3 ♂, "Pa." [A. M. N. H.]. 2 ♂, 1 ♀, Roxborough, May 31, June 7, 1908, (F. Haimbach) [A. N. S. P., ex Haimbach]. 1 ♀, Lansdale, July 3, 1910, [A. N. S. P.]. 1 ♀, Philadelphia, June 9, [A. N. S. P.].

MARYLAND: 3 ♂, 2 ♀, Camp Meade, May to June, 1919, (R. C. Shannon), [Shannon]. 1 ♀, Plummer's Island, May 10, 1916; 1 ♂, May 12, 1913, (W. L. McAtee), [Biol. Surv.]. 1 ♀, near Plummer's Island, May 14, 1915, (R. C. Shannon), [U. S. N. M.]. 1 ♂, College Park, May 2; 1 ♂, May 7, 1913, [Md. Agr. College].

DISTRICT OF COLUMBIA: 1 ♂, Washington, April 28, 1912, [M. D. Leonard, ex Van Duzee]; 1 ♂, April 28, 1913, (W. L. McAtee), [Biol. Surv.]; 1 ♂, (A. N. Caudell), [U. S. N. M.]. 1 ♂, 1 ♀, Rock Creek Park, [U. S. N. M.]. 2 ♂, Anacostia, May 4, 1913, (P. R. Myers), [U. S. N. M.].

VIRGINIA: 1 ♂, [U. S. N. M.]. 2 ♂, [A. N. S. P.]. 1 ♂, Glencarlyn, April 27, 1903, (A. N. Caudell), [U. S. N. M.]. 2 ♂, 2 ♀, Blacksburg, May to June 1916, [Va. Agr. College]. 1 ♂, Dead Run, Fairfax County, May 27, 1915; 1 ♀, May 19, 1916, (R. C. Shannon), [Shannon]. 1 ♀, Great Falls, May 12, (N. Banks), [M. C.

Z.]; 1 ♀, May 2, 1916, (W. L. McAtee), [Biol. Surv.]; 2 ♂, April 20, 1913, (R. C. Shannon); 1 ♂, May 12, 1911, (S. A. Rohwer), [U. S. N. M.]; 3 ♂, 3 ♀, May 2, 11, 1917, (C. T. Greene), [U. S. N. M., Div. Forest Ins.]. 2 ♂, Falls Church, May 5, 1913; 1 ♀, May 19, 1916, (C. T. Greene), [U. S. N. M., Div. Forest Ins.]. 1 ♀, Roslyn, May 11, 1913, (F. Knab), [U. S. N. M.]. 1 ♂, Maywood, Alexandria County, May 19, 1916, (W. L. McAtee), [Biol. Surv.].

NORTH CAROLINA: 1 ♂, [U. S. N. M.]. 1 ♀, Black Mountains, June, [A. M. N. H.]; 1 ♀, [Brook. Mus.].⁴⁵

FLORIDA: *

OHIO: 1 ♂, 1 ♀, Cedar Point, Sandusky, May 30, 1903; 1 ♂, Danville, May 19, 1899; 1 ♂, 1 ♀, Flint, May 10, 1903, [all Hine]. 4 ♂, 3 ♀, Wooster, May and June, [Ohio Agr. Exp. Sta.].

INDIANA: 1 ♀, [A. M. N. H.]. 1 ♂, [Kansas]. 1 ♂, 1 ♀, Dyer, June 4, 1899, [A. M. N. H.].

ILLINOIS: 2 ♂, 2 ♀, Algonquin, 1 of which is June 10, 1898, (Wm. A. Nason); 1 ♂, Dubois, April 28, 1908; 4 ♂, Dongola, May 9, 12, 1916; 1 ♀, Carbondale, April 27, 1908; 1 ♀, Oregon, June 19, 1917; 1 ♂, Matanzas Lake, Havana, May 1, 1912, [all U. of Ill.]. 1 ♂, "N. Ill." [A. N. S. P.]. 1 ♂, Chicago, May 28, 1899, [A. M. N. H.].

MICHIGAN: 1 ♀, June 4, 1890; 1 ♂, June 3, 1916, East Lansing (?), [Mich. Agr. College]. 1 ♀, South Haven, May 22, 1891, [Mich. Agr. College]. 1 ♀, Ann Arbor, June 14, 1919, (E. G. Anderson), [Shannon]. 1 ♂, Detroit, June 9, 1906 [A. N. S. P.]. 1 ♂, Alpena, (Wm. A. Nason), [U. of Ill.]. 1 ♂, Madison, [U. of Ill.]. 1 ♂, [U. S. N. M., ex Aldrich].

WISCONSIN: 2 ♀, [A. M. N. H.]. 2 ♂, Polk County, July, (C. F. Baker), [Cole]. 2 ♂, "Wis." [U. S. N. M., ex Aldrich]. 1 specimen, "Wis." [Stanford U.]. 3 ♂, 1 ♀, Pine Lake, June 7, 1890, [A. M. N. H.]. 1 ♂, Beaver Dam, [A. N. S. P., ex Dietz]. 2 ♂, Amery, May 30, 1918, (Q. Lowry), [N. H. Agr. College]. 1 ♂, "Wis." May, [Wash. State College].

MINNESOTA: 2 ♂, 1 ♀, Basswood Lake, [Minn. Agr. Exp. Sta.]. 1 ♂, Lake Itasca, June 3, 1914, [U. of Minn.]. 1 ♀, Lake Itasca, June 9, 1920, (S. A. Graham) [U. of Minn.]. 1 ♀, St. Anthony Park, June 10, 1920 (H. H. Knight), [U. of Minn.].⁴⁶

IOWA: 1 ♂, 1 ♀, Ames, [U. S. N. M.].

MISSOURI: 1 ♀, [U. S. N. M.]. 1 ♂, Cadet, [U. S. N. M.]. 1 ♀ "C. Mo." [Wash. State College, ex Wescott].

NEBRASKA: 2 ♂, South Bend, May 1905, (L. Bruner, M. H. Swenk), [Nebraska].

⁴⁵ C. S. Brimley reports that the N. Carolina Dept. of Agr. Collection has: eight specimens from Linville Falls, late May, 1920; three from Sunburst, late May (F. Sherman); two, Raleigh, late April (C. L. Metcalf); one, Craggy Mountain, June 18, 1916, (R. W. Leiby).

⁴⁶ Ruggles reports that the Minnesota Agr. Exp. Sta. Collection has specimens from Ramsen, Hennepin, and Olmstead Counties.

* Recorded from Jacksonville by Johnson (1913: 54).

MANITOBA: 1 ♂, Stockton, June 21, 1905, (N. Criddle), [C. N. M.].

This is a well defined, well known species and is common apparently throughout the greater part of its range.

Rhagio obscuripennis Bigot

1887. *Leptis obscuripennis* Bigot, Bul. Soc. Zool. Fr., XII, p. 107.

1908. *Leptipalpus obscuripennis* Kertész, Cat. Dip., III, p. 317.

As is the case with several other of Bigot's species, no specimens can so far be referred with any certainty to his *obscuripennis*. Therefore a translation of the original description is here given:

"Length, 6 mm. ♂. Antennae, palpi and face fulvous; thorax fulvous, tergum opaque black, scutellum black, fulvous bordered; halteres fulvous, knob fuscous; abdomen obscure fulvous, apex broadly, and segments at base, infuscated; feet testaceous, tarsi at apex fuscous; wings almost hyaline, at base broadly, diffusely infuscated, stigmal spot diffuse, tinged fuscous black; anal cell closed before margin; palpi small, almost bare.

"Antennae, face and palpi a rather dark fulvous; thorax fulvous with a broad disc of opaque black; scutellum black, on border fulvous; halteres fulvous, on knob blackish; abdomen dark fulvous, broadly tinged with blackish at the tip, as well as at the base of the segments; feet testaceous, tip of the tarsi brownish; wings almost hyaline, the basal half brown, but not sharply defined. Stigmal spot diffuse, blackish; palpi very small and seemingly almost bare; anal cell of the wings closed before the border.

"North America. Rocky Mountains, 3 specimens."

Rhagio ochraceus Loew

1862. *Leptis ochracea* Loew, Berl. Ent. Zeitschr., VI, p. 187.

1908. *Rhagio ochraceus* Kertész, Cat. Dip., III, p. 309.

I am somewhat in doubt as to the validity of this species. I have studied Loew's type, however, and would describe it as follows, although my description does not quite agree with the original description in all cases; this is due possibly to the fact that the type has wrinkled somewhat, possibly being rather teneral when pinned:

Female.—Length, 9 mm. Head: Face and front blackish, grayish white pollinose; antennae, proboscis, and palpi yellowish, the latter with pale hairs.

Thorax: Mesonotum shining yellowish, three broad indistinct brownish-yellow stripes which give the dorsum a brownish-yellow cast; scutellum yellowish, both this and the mesonotum covered with short black hairs; humeral calli very pale yellowish; pleura yellowish; halteres ochraceous, the knobs only slightly infuscated.

Abdomen: Slightly shining, ochraceous, and immaculate, but due to rather bad wrinkling in drying it appears in certain lights, to be quite distinctly banded with

blackish; on segments five to seven there seems to be a very narrow band at the incisures, which looks slightly darker; eighth segment wholly darkened.

Legs: Yellow, except the apex of the anterior femora and the apical third of the anterior tibiae faintly infuscated; tarsi infuscated, the base of the middle pair slightly paler.

Wings: Almost hyaline; costal cell ochraceous; the tip distinctly darkened; the cross-veins both above and below the base of the discal cell, the two veins forming the apex of the discal cell and the base of the radial sector, all distinctly infuscated; nearly all the veins brownish.

The only other specimen in the Museum of Comparative Zoology collection is a female labelled "Osten Sacken, N. Y." In this the lines on the thorax are almost indistinguishable and the wings are paler; the legs are yellowish; there is a broad subapical distinctly brownish ring on the front femora and on the apex of the front tibiae.

In addition to the type a female from "New York, Edwards" and the Osten Sacken female, both in the Museum of Comparative Zoology Collection, I have seen four females from Pennsylvania determined as *ochraceus* Lw. as follows: 2 ♀, Castle Rock, (C. T. Greene), June 3, 1906; [the former in A. N. S. P., the latter in Pa. Dept. Agr. Coll.]. 1 ♀, Roxboro, June 24, 1908, [Pa. Dept. Agr. Coll.]. 1 ♀, Philadelphia, June 11, 1891 [U. of Ill.].

The first from Castle Rock was determined by C. T. Greene and I believe it is *ochraceus* but I doubt if the other three are, and believe that the specimen from Philadelphia, determined by C. W. Johnson, and the one from Roxboro might be more correctly referable to *vertebratus* Say.

Mr. C. W. Johnson writes me under date of June 7, 1928 as follows: "On June 20, 1926, Dr. J. G. Myers took an interesting specimen at Forest Hills, Mass. From the wing markings I consider it a dark colored *Rhagio ochraceus* Loew, but the body is darker, the abdomen is yellow with a dorsal row of spots and the lateral margins black."

***Rhagio palpalis* Adams**

1904. *Leptis palpalis* Adams, Kans. Univ. Sci. Bul., II, p. 442.

1908. *Rhagio palpalis* Kertész, Cat. Dip., III, p. 309.

I have been unable to refer any specimens with any certainty to this species and have not had an opportunity to study the type. The original description follows:

"*Male*.—Head black, occiput, frontal triangle, face and cheeks gray pollinose and white pilose; proboscis and palpi yellow, pile of latter black; antennae dark

fuscous, tip of second joint, and third wholly, yellowish, arista black. Thorax black; mesonotum brownish pollinose, marked with a hair line in the middle, two subdorsal broader ones, and lateral margins gray pollinose, pile black; humeri testaceous, scutellum likewise, with base and pile black; pleura gray pollinose, pile above front coxae, and on metapleura white; halteres yellow. First, second, third and fourth abdominal segments, except in middle and on sides, yellow; remaining segments, except narrow posterior margins, black; pile black. Coxae black, with white and black pile, trochanters black, femora except poorly defined brownish ring in middle of the two anterior pair, and apical half of hind pair, yellow; four front tibiae yellow, hind ones and all tarsi fuscous. Wings hyaline, with a sub-fuscous tinge, most prominent on anterior half and along veins; stigma elongate. Length, 10.5 mm.

"One specimen; Washington."

Rhagio pleuralis Adams

1904. *Leptis pleuralis* Adams, Kans. Univ. Sci. Bul., II, p. 441.

1908. *Rhagio pleuralis* Kertész, Cat. Dip., III, p. 309.

This species has not been recognized since it was first described. The original description follows:

"*Female*: Head black, grayish pollinose, pile yellowish white, antennae brown, first joint yellowish, proboscis brownish yellow; mesonotum black, gray pollinose, viewed from behind subshining, except lateral margins and two subdorsal lines, short pile yellowish, longer ones more numerous and black humeri and postalar callosities tinged with yellow; pleurae variegated with brown and yellow, almost wholly devoid of pile, scutellum with a yellowish cast, brownish on top, halteres yellow; abdomen testaceous, a spot on fourth segment and fifth segment except narrow hind border, piceous, following segments opaque, pile mostly pale yellowish, a few black ones; coxae and legs yellow, tip of tarsi brown, pile of coxae whitish yellow, those of legs short, yellow and intermixed with black ones; wings hyaline, tinged with fuscous along anterior margin and base, stigma almost obsolete. Length, 7 mm.

"One specimen; Washington. Close to *L. albibarbis* Bigot, but is smaller, thorax subshining, coxae and legs less marked with fuscous."

Rhagio plumbeus Say (Pl. II. fig. 11)

1823. *Leptis plumbea* Say, Jour. Acad. Nat. Sci. Phila., III, p. 39. 10

1867. *Leptis griseola* Van der Wulp, Tijdschr. v. Ent., x, p. 142, pl. 4, fig. 5.

1908. *Rhagio plumbeus* Kertész, Cat. Dip., III, p. 309.

Blackish, halteres yellow; tibiae except apex and the base of the matatarsi usually brownish yellow to yellowish; wings with three irregular more or less well defined brownish bands on the apex, from the stigma through tip of discal cell and from fork of radial sector to branch of cubitus; costal cell and a spot on each vein near anal

border also brownish; stigma usually well defined, blackish. A single more or less elongate spot in cell R_5 above apex of discal cell.

Male.—Length, 5 to 6 mm. Head: Face, frontal triangle, ocellar tubercle, palpi, proboscis and antennae blackish, all more or less dusted with light gray or whitish pollen; sides of face and the palpi with long hairs, usually blackish but often wholly pale or intermixed with pale hairs; antennae with several black hairs on first two segments, longer on first.

Thorax: Mesonotum with three more or less definite broad dark brownish stripes, the middle one often narrowly divided along the median line, remainder gray pollinose; hairs on mesonotum long, black, fairly abundant; pleura and scutellum blackish, gray pollinose, the latter with long black hairs; halteres yellowish.

Abdomen: Blackish, with fairly abundant pale hairs which are longer and more erect at sides.

Legs: Blackish, tibiae and metatarsi except apex brownish yellow to yellowish brown, metatarsi usually the darker color; coxae grayish pollinose, the usual hairs usually pale.

Wings: Ornamented with brownish somewhat as follows: The costal cell, three irregular and more or less well defined bands—on the apex, from the stigma through the tip of the discal cell, and from the fork of the radial sector to the branch of Cu; usually a spot on each vein near anal border and brownish areas in basal cells, and along anal vein; stigma elongate, dark brown. The paler specimens do not have all of these areas so well marked. There is a *single more or less elongate spot* in cell R_5 between the fork of R_4+5 and the apex of the discal cell.

Female.—Length, 5 to 6 mm. Similar to male except that front and ocellar tubercle are brownish, usually somewhat satiny, the former often with a slight median depression; the hairs of the abdomen are shorter and very sparse, even on the sides they are not as long nor as abundant as in the male.

Specimens Examined: About 151 males and females.

ONTARIO: 1 ♂, Bothwell, May 25, 1926, (G. S. Walley); 1 ♂, Chatham, May 20, 1925, (G. S. Walley); 1 ♂, Lobo, May 20, 1925, (A. A. Wood); 2 ♂, Jordan, May, 1915, (W. A. Ross), [all C. N. M.].

VERMONT: 2 ♂, 1 ♀, Mount Equinox, June 5, 1910, [B. S. N. H.].

MASSACHUSETTS: 2 ♂, Mount Greylock, June 15, 1906; 1 ♀, Cheshire, [all B. S. N. H.].

CONNECTICUT: 1 ♂, Norfolk, May 21, 1916, (W. L. McAtee), [Biol. Surv.].

NEW YORK: Newport and Ilion, May, (D. B. Young), [N. Y. S. M.]. Woodville, Lake Ontario, June, (H. D. House), [N. Y. S. M.]. 1 ♀, Honeoye Falls, May 16, 1913, (M. D. Leonard), [Leonard]. 1 ♂, 1 ♀, Hamburg, May 22, 1910, (M. C. Van Duzee), [Van Duzee]. 1 ♀, East Aurora, May 5, 1910, (Wm. Wild), [Van Duzee]. 56 ♂ & ♀, Ithaca, May 5 to 29, over several years [C. U.]. 2 ♂, 3 ♀, Taughan-nock Falls, May 15, 1915, [C. U.]. 4 ♂, McLean Bogs, May 30, 1914; 1 ♀, May 31, 1913, [C. U.]. Corinth, May, (D. B. Young), [N. Y. S. M.]. Albany, May, (D. B. Young), [N. Y. S. M.]. 1 ♂, Thatcher State Park, Helderberg Mountains; 1 ♂, Rensselaer, May 27, 1920, (M. D. Leonard), [N. Y. S. M.]. 2 ♂, Florida,

June 13, and Durlandville, May 29, 1917 (S. W. Frost), [C. U.]. 1 ♂, Richmond Hill, L. I.; 1 ♂, 1 ♀, Sea cliff, L. I., May (N. Banks), [C. U.].

NEW JERSEY: 1 ♀, Clementon, June 2, 1901, [A. N. S. P.]. 1 ♂, Ridgewood, June 17, 1911, (M. D. Leonard), [Leonard]. 1 ♀, Hemlock Falls, May, [A. M. N. H.]. 3 ♂, Paterson, May 3, [Brook. Mus.].

PENNSYLVANIA: 1 ♂, Ardmore, May 5, 1912, (H. Skinner); 4 ♂ two miles north of Narberth, Montgomery County, May 16, 1925, (E. T. Cresson, Jr.); 1 ♀, Holmsburg, Philadelphia County, May 19, 1912, (E. T. Cresson, Jr.); 2 ♂, Unionville, Philadelphia County, May 3, 1908; 1 ♀, Glenside, May 9, 1908; [all A. N. S. P.]. 2 ♂, Roxboro, May 9, 1909, (F. Haimbach); 2 ♂, Fairmount Park, Philadelphia, May 6, 1905, (F. Haimbach), [A. N. S. P., ex Haimbach]. 1 ♂, Delaware County, May 5, 1899, [Kansas]; 4 ♂, May 5, 1895, [U. of Ill.]; 1 ♂, May 5, 1895, [M. D. Leonard, ex Johnson]; 1 ♂, May 5, 1899, [Brook. Mus.]; 1 ♀, May 5, 1894, [A. N. S. P.]. 4 ♂, Castle Rock, May 3, 1908 and May 12, 1909, (Harbeck), [U. S. N. M., ex Aldrich]; 1 ♂, May 19, 1902; 2 ♀, May 29, 1904; 1 ♂, [Pa. Dept. Agr.]. 4 ♂, 1 ♀, May 11, 1905, May 15, 1906, May 12, 1907, [A. N. S. P.]. 1 ♂, Montgomery County, May 3, [Brook. Mus.]. 1 ♂, Harrisburg, May 8, 1918, (King), [Pa. Dept. Agr.]. 2 ♂, 1 ♀, Swarthmore, May 5 and 13, 1907; 1 ♂, May 6, 1906, (E. T. Cresson Jr.), [A. N. S. P.].

MARYLAND: 1 ♀, Beltsville, June 14, 1914, [Biol. Surv.].

NORTH CAROLINA: 1 ♂, May, and 2 ♀, June, Black Mountains, [A. M. N. H.]. Canton, June, 1910, (F. Sherman), [N. Car. Dept. Agr.]. Hendersonville, June, 1907, (F. Sherman), [N. Car. Dept. Agr.].

OHIO: 2 ♂, Columbus, May 11, 1902, [Hine].

(?) MICHIGAN: 1 ♂, June 1, 1895, [Mich. Agr. College, no. 217].

INDIANA: 6 ♂, Lafayette, May 1, 4, 9, [U. S. N. M., ex Aldrich]. 2 ♂, Bluffton, May 11, 1902, (C. C. Dean), [Hine].

ILLINOIS: 1 ♂, Chicago, May 21, 1909, (in an onion field), [U. of Ill.]; 1 ♂, June 15, 1898, [C. T. Brues]. 1 ♂, Matanzas Lake, Havana, May 2, 1914; 1 ♀, May 1, 1912, [U. of Ill.].

WISCONSIN: 1 ♀, "Wis." [W. G. Dietz]. 4 ♀, White Fish Bay, May 30, 1890, [A. M. N. H.]. 4 ♂, "Wisconsin" [A. M. N. H.].

IOWA: 1 ♂, Iowa City, (Wickham), [U. S. N. M., ex Aldrich].

This species is very closely related to *R. punctipennis* Say. The males of the two species may be separated by the single brown spot in the center of cell R_5 and the wholly blackish abdomen (*plumbeus*) and the two spots near the center of cell R_5 and the yellowish on the basal segments of the abdomen (*punctipennis*). The females differ mostly in the wing markings and in the lighter color of the fore tibiae. I have examined about one hundred and fifty specimens of *plumbeus* and about two hundred and fifty of *punctipennis* and in this series males of *plumbeus* could be found occasionally with the spot in cell R_5 either very faint in the

middle or actually divided into two spots as in *punctipennis*. This condition occurred in both wings or the spot on one side is partially, on the other wholly, divided. Females in which this condition occurs, as it does occasionally, are somewhat difficult to properly place. However I believe that there are here two fairly distinct species and would certainly hesitate to combine them without seeing a great deal more material. Mr. C. W. Johnson tells me that in New England *plumbeus* is mostly an early May one and is later replaced by *punctipennis*. I have often observed at Ithaca, New York that *plumbeus* occurs somewhat earlier than *punctipennis*.

Rhagio pollinosus new species

Wholly rather light gray pollinose, sometimes somewhat subshining; eyes distinctly separated in the male; mesonotum with blackish hairs, trivittate; abdomen with pale hairs; halteres yellowish or tinged more or less with brownish; legs brownish yellow, femora usually somewhat darker; wings very slightly tinged with grayish, veins dark brown, stigma indistinct.

Male.—Length, 5 to 5.5 mm. Head: Eyes separated by slightly more than the width of the ocellar tubercle; the front with sides parallel and mostly brownish pollinose except narrowly along the sides and just above the antennae which with the face are light gray pollinose; sides of face and the cheeks with fine whitish hairs which are longer on the cheeks; proboscis and palpi yellowish brown or dark brownish, more or less gray pollinose, the latter with rather long black hairs which, however, in some lights appear rather pale; antennae almost black, first and second segments with a few short black hairs; occiput light gray pruinose with short black hairs behind eyes; ocellar tubercle with a few rather long black hairs.

Thorax: Mesonotum pale gray pollinose with three broad dark brown slightly subshining stripes, the middle one distinctly not reaching the scutellum and sometimes faintly divided on the median line; with sparse, rather long, almost erect black hairs which tend more or less to be arranged in rows especially on the disc; scutellum dark brown, somewhat subshining, on edge light gray pollinose, furnished with a few rather long black hairs; metanotum light gray pollinose, bare; pleura light gray pollinose, the propleural and metapleural hairs pale, the latter rather long; halteres yellowish, more or less tinged with brownish especially on the knob and sometimes towards the base of the stalk.

Abdomen: Wholly gray pollinose but on each segment with a broad fairly distinct rather dark brown band somewhat subshining and usually produced caudad in the middle, the band being obsolete in the first and on the last two or three segments; above and below with rather abundant, fairly short somewhat appressed pale hairs, which in some lights appear golden.

Legs: Coxae light gray pollinose, the hairs whitish; remainder of legs yellowish, more or less tinged with brown, especially a broad band involving usually all but

the base and tip of the femora; the tibiae darkened especially at the tip and the tarsi strongly tinged with dark brownish.

Wings: Membrane very faintly tinged with grayish; veins dark brown; stigma pale brownish to almost obsolete.

Female.—Length, 5 to 6 mm. Similar to male except that front is almost twice the width of the ocellar triangle and the legs, on the whole, seem inclined to be a little paler. In several specimens the anal cell is distinctly closed at the border and in one it even has a short petiole in both wings alike.

Holotype.—Male; Los Angeles, California, March, [U. S. N. M., Cat. no. 24063].

Allotype.—Female: as above.

Paratypes.—Eight ♂ and ♀ as follows: 1 ♂ and 3 ♀, Los Angeles, California, March, [U. S. N. M.]; 1 ♂ and 1 ♀, as above, [Leonard]; 1 ♂, Stanford University, Mar. 6, 1910, (F. R. Cole) [returned to F. R. Cole]; 1 ♀, San Diego, California, Mar. 24, 1913, (E. P. Van Duzee), [returned to E. P. Van Duzee for California Academy of Sciences Colln.].

This species is apparently near *R. pruinus* Bigot as far as can be ascertained from Bigot's description and an attempt was made to refer the specimens to this species. After making due allowance for discrepancies between the above material and Bigot's somewhat careless descriptions the fact that the eyes are so broadly separated in the male and that the mesonotum has rather long black hairs, seemed to warrant assigning the material to a new species. These two characters, especially the former, are so striking that it would seem that Bigot could hardly have overlooked them. *R. pollinosus* falls in that group of *Rhagio* which have the eyes of the male separated and the sides of the front parallel and which is composed of *R. gracilis* Johns., *californicus* n. sp., and *brunneipennis* n. sp.

***Rhagio pruinus* Bigot**

1887. *Leptis pruinosa* Bigot, Bul. Soc. Zool. France, XII, p. 115.

1908. *Rhagio pruinus* Kertész, Cat. Dip., III, p. 310.

I am unable at the present time to refer any of the small dark Western specimens of *Rhagio* which I have seen to this species. It may be closely related to or identical with my *R. pollinosus* described herein but I doubt it (see discussion under *pollinosus* above). A transcription of Bigot's latin diagnosis and a translation of his French description follows:

"Long., 6 mm. ♂. Obscure fusca, cinereo flavido pruinosa. Abdomen utrinque cinereo flavido pilosa; antennis et facie nigris; palpis fuscis, albido-flavido dense villosis; halteribus fulvis, clava fusca; coxis nigris; pedibus fulvis; femoribus fere totis tarsi, obscure fuscis; alis pallide flavidis, apice extrinsecus, cinereo tinctis, macula stigmatica minima, fuscana.

"Blackish, covered with a thick grayish-yellow pruinosity; abdomen with long, pale yellowish hairs laterally; antennae, face and palpi black, the last with whitish hairs; halteres tawny, blackish at the tip; feet tawny, femora and tibiae almost entirely black; wings yellowish, outer border at the tip, gray, stigmal spot very small diffuse brownish."

Coquillett (1900: 406) repeated in Harriman Alaska Exped.* records the determination of two specimens from Popof Island, Alaska, July 10, as *pruinus* Big. An examination of these in the U. S. National Museum Collection showed them to be females. I was unable to place them at the time—several years ago—but they could certainly not be called *pruinus*.

Rhagio punctipennis Say (Pl. II. fig. 16)

1823. *Leptis punctipennis* Say, Jour. Acad. Nat. Sci. Phila., III, p. 39.

1848. *Atherix filia* Walker, List. Dip. Brit. Mus., I, p. 219.

1908. *Rhagio punctipennis* Kertész, Cat. Dip., III, p. 310.

Similar to *R. plumbeus* Say but with more or less yellowish on-basal half of abdomen and with two brown spots in center of cell R_5 instead of one.

Male.—Differs only from *plumbeus* in the wing markings and in having abdomen more brownish with basal three or four segments more or less brownish yellow. This lighter color may occupy only a narrow apical band or leave only a central brownish spot connected with a narrow band in front of the same color; intermediate conditions occur between these two extremes; the lighter color may even be reduced to a faint apical band on each of first two segments.

Female.—Apparently differs from *plumbeus* only in the wing markings, although there seems to be a tendency for the sides of the face to have the hairs pale as a rule and sparser and for the abdomen to be more of a distinctly brownish cast. Fore tibiae whitish with blackish apex sharply defined.

Specimens Examined: About 252 males and females.

QUEBEC:⁴⁷

MAINE:⁴⁸

⁴⁷ Recorded from Montreal by Winn & Beaulieu (1915: 123).

⁴⁸ Recorded by Johnson (1925: 105) from the following "Areas:" "The Lower Kennebec and Southeastern Maine"; "The White Mountain and Mount Monadnock and Hampton" of New Hampshire; "The Northern 'Green Mountains' of Vermont"; and "The Berkshire, Essex County, Boston, Plymouth, Cape Cod, Nantucket, and Bristol County" of Massachusetts.

* Vol. 9, Pt. 2, p. 20, (1904).

NEW HAMPSHIRE: 6 ♂, Franconia, [A. M. N. H., ex. Slosson].⁴⁸

VERMONT:⁴⁸

MASSACHUSETTS: 1 ♂, Forest Hills, June 3, 1916, (J. W. Chapman), [Brues]. 2 ♂, Boston, (Hy. Edwards), [A. M. N. H.]. 1 ♂, Waverly, (Hy. Edwards), [A. M. N. H.]. 2 ♂, Amherst, June 20, 1904; 1 ♀, June 23, 1904, [Mass. Agr. College]. 1 ♀, North Reading, June 10, [Leonard, ex Johnson]. 1 ♂, Beverly, June 15, 1871; 1 ♂, June 17, 1868; 1 ♀, June 7, 1870, [all U. S. N. M.]. 1 ♀, Bass Rocks, June, [A. N. S. P., ex Dietz]. 3 ♂, Boston, June, [A. L. Melander].⁴⁸

RHODE ISLAND: 1 ♂, Kingston, June 23, 1905, [R. I. Agr. College, Lot 25, no. 69].

CONNECTICUT: 1 ♂, Ridgefield, June 24, 1916, (I. N. Gabrielson), [Biol. Surv.]. 1 ♂, Norwalk, June 4, 1916, (I. N. Gabrielson), [Biol. Surv.]. 2 ♂, New Haven, May 15, 1910, (A. B. Champlain), [Pa. Dept. Agr.]; 1 ♂, May 15, 1910, (A. B. Champlain), [U. S. N. M., ex Walton]; 1 ♂, June 11, 1914, (B. H. Walden), [Conn. Agr. Exp. Sta.]; 1 ♂, June 16, 1915, (M. P. Zappe), [Conn. Agr. Exp. Sta.]. 2 ♂, "Conn." [A. M. N. H., ex. Osten Sacken]. 1 ♀, Colebrook, August 9, [A. M. N. H., ex. Wheeler]. 2 ♂, Unionville, June 10, 1904, (W. E. Britton), [Conn. Agr. Exp. Sta.]. 1 ♀, Stonington, June 7, 1906, (W. E. Britton), [Conn. Agr. Exp. Sta.].⁴⁹

NEW YORK: Speculator, June, (D. B. Young), [N. Y. S. M.]. 1 ♂, 1 ♀, Gloversville, Sept. 20, 1910, (C. P. Alexander), [C. U.]. 1 ♂, Kaimesha, [Brues]. Tompkins County, several localities, [C. U.]. 1 ♂, Sterling Forest, May 30, [Brook. Mus.]. Poughkeepsie, May, (D. B. Young), [N. Y. S. M.]. 1 ♂, Nyack, 1883, (J. L. Zabriskie), [A. M. N. H.]. 1 ♀, White Plains, (J. Bequaert); June 29, 1918, [A. M. N. H.]. 1 ♂, Mount Kisco, June 30, 1915, [N. Y. S. M.]; 4 ♂, 4 ♀, June 8, (J. R. de la Torre Bueno), [Bezzi]. 3 ♂, 2 ♀, "Staten Island," May 29 to June 8; 1 ♂, 1 ♀, June 4, (Wm. T. Davis), [Davis]. 10 ♂, 8 ♀, New Dorp, [Burns]. 2 ♂, Sands Point, June 15, 1919, (E. J. Burns), [Burns]. 3 ♀, Bethpage, June 25, 1927, (H. C. Hallock), [C. U.]. 1 ♂, Lott's Wood, [A. M. N. H.]. 3 ♂, 2 ♀, Richmond, May 23 to June 11, 1911 [Burns]. 2 ♀, Richmond Hill, July 3, 1905; 1 ♂, July 3, 1901, [Pa. Dept. Agr.]. 1 ♂, Sea Cliff, June, (N. Banks), [Banks]. 13 ♂, 10 ♀, Flatbush, May to June, (J. L. Zabriskie), [A. M. N. H.]. 1 ♀, Wood Haven, July 7, [Brook. Mus.]. 1 ♂, 1 ♀, "in coitu," Staten Island, June 11, (Wm. T. Davis), [Davis].

NEW JERSEY: 3 ♂, Merchantville, May 25, 1902, (E. Daecke), [Pa. Dept. Agr.]. 1 ♂, 1 ♀, Newark, June 14 and 16, 1892, [U. S. N. M., ex Aldrich]. 3 ♀, Great Notch, May 30, (Wm. T. Davis), [Davis]. 1 ♀, Ridgewood, July, 1910, (M. D. Leonard), [Leonard]. 1 ♂, Newfoundland, May 26 to 30, 1910, [A. M. N. H.]; 1 ♂, May, [Brook. Mus.]. 1 ♂, Trenton, June 13; 6 ♂, 3 ♀, Malaga, June 1, 1907, [all A. N. S. P.]. 1 ♂, 1 ♀, New Brunswick, June 6 and 18, [A. M. N. H.]. 2 ♀, Hemlock Falls, May and June, [A. M. N. H.]. 1 ♀, Pallisades-on-Hudson, June 1, 1912, [A. M. N. H.]. 1 ♂, Waverly, June, [A. M. N. H.]. 5 ♂, 2 ♀,

⁴⁹ Reported by Britton, in the Connecticut Agr. Exp. Sta. Collection from Westville, June 3 and 14, 1905; and Hamden, June 15, 1911. Also recorded from this state from May 23 to August 8, by Johnson (1925: 105).

Ramsey, June 4 to 14, 1916, (J. Bequaert), [A. M. N. H.]. 1 ♂, Lahaway, [A. M. N. H.]. 1 ♀, Long Branch, June 11, [Brook. Mus.]. 1 ♂, Longwood Valley, May 25, 1910, (Wm. T. Davis), [Davis]. 1 ♀, Dover, June 17, 1892, [U. S. N. M., ex. Aldrich]. 2 ♂, Clementon, May 30, 1895, [U. of Ill.]; 1 ♀, June 2, 1901, [A. N. S. P.]. 1 ♂, 1 ♀, Moorestown, June 21, 1924, (H. C. Hallock), [C. U.].

PENNSYLVANIA: 3 ♀, Hazleton, May 26 to July 2, [A. N. S. P., ex Dietz]. 1 ♀, Philadelphia, [A. N. S. P.] and 2 ♀, June 12, 1892, [one of which is in the U. S. N. Mus. Colln., the other in M. D. Leonard's Colln.]. 2 ♂, 1 ♀, Castle Rock, May 21, 1905, July 3, 1910, [A. N. S. P.]; 1 ♂, May 26, 1908, (E. Daecke), [Pa. Dept. Agr.]; 1 ♂, June 16, 1904, [Pa. Dept. Agr.]. 1 ♂, 1 ♀, Swarthmore, June 8, 1905, (E. T. Cresson, Jr.), [A. N. S. P.]. 1 ♂, Lansdale, May 16, 1909, (E. T. Cresson, Jr.), [A. N. S. P.]. 2 ♂, Glenside, June 16, 1907; 1 ♀, Montgomery County, June 2, 1895, [all A. N. S. P.]. 7 ♂, Roxboro, May 26, (F. Haimbach), [A. N. S. P., ex Haimbach]. 1 ♂, Wawa, May 25, 1907, [Pa. Dept. Agr.]. 1 ♂, Whetzel's Swamp; Harrisburg, May 30, [Pa. Dept. Agr.]. 2 ♂, Harrisburg, June 7 and 12, (W. R. Walton), [U. S. N. M., ex Walton]. 1 ♂, Inglenook, May 20, 1911, (H. B. Kirk); 1 ♂, May 28, 1911; 1 ♂, Linglestown, May 5, 1910, (W. S. Fisher); 11 ♂, State College, May 30, 1908; 1 ♂, Perdix, June 11, 1911, [all Pa. Dept. Agr.]. 6 ♂, Paxtang, May 26, 1918, [Anderson]. 3 ♂, 2 ♂, Germantown, June 12, and 18, 1904, May 20, 1905, June 4, 1905, [A. N. S. P.]. 1 ♀, Lehigh Gap, June 26, 1901, [Brook. Mus.]. 1 ♂, Delaware Water Gap, (A. T. Slosson), [A. M. N. H.]. 1 ♀, Highspire, May 22, 1909, (W. R. Walton), [U. S. N. M., ex Walton].

DELAWARE: 1 ♂, "Delaware" [A. N. S. P.].

MARYLAND: 1 ♀, Beltsville, June 14, 1914; 1 ♂, May 17, 1914; 1 ♀, Branchville to Beltsville, June 4, 1914, (W. L. McAtee), [Biol. Surv.]; 3 ♂, 2 ♀, June 1, 1916, (R. C. Shannon), [U. S. N. M.]. 1 ♂, Plummer's Island, May 19, 1916, (R. C. Shannon), [Shannon]. 1 ♀, May 30, 1909, (W. L. McAtee), [U. S. N. M.]. 1 ♂, Camp Meade, June to July, 1919, (R. C. Shannon), [Shannon]. 1 ♀, Great Falls, May 15, 1914, (R. P. Currie), [U. S. N. M.]. 1 ♂, Hyattsville, May 11, 1913, (August Busck), [U. S. N. M.]. 1 ♀, Chesapeake Bay, May 29 to June 2, 1912, (Palmer and Weed), [U. S. N. M.].

DISTRICT OF COLUMBIA: 1 ♀, Washington, (F. C. Pratt); 1 ♂, Park Road, June 8, 1916, (C. H. T. Townsend; "in house"); 2 ♂, 1 ♀, Rock Creek, June 12, 1917, (C. H. T. Townsend), [all U. S. N. M.].

VIRGINIA: 1 ♀, Dead Run, May 27, 1915, (R. C. Shannon), [U. S. N. M.]; 1 ♂, May 19, 1916, (R. C. Shannon), [Shannon]. 1 ♂ near Plummer's Island, June 2, 1916, (W. L. McAtee), [Biol. Surv.]. 1 ♂, Roslyn, May 11, 1913, (F. Knab), [U. S. N. M.]. 1 ♀, Glencarlyn, June 15, 1913, (F. Knab), [U. S. N. M.]; 1 ♂, 3 ♀, May 30, (N. Banks), [M. C. Z.]. 3 ♂, Glencarlyn to mouth of 4-Mile Run, June 11, 1916, (W. L. McAtee), [Biol. Surv.]. 2 ♂, 1 ♀, Falls Church, May 21 and 30, (N. Banks), [M. C. Z.]. 1 ♂, Mt. Vernon, June 6, 1915, (W. L. McAtee), [Biol. Surv.].

NORTH CAROLINA: 1 ♂, Lake Toxaway, (A. T. Slosson), [U. S. N. M.]. 2 ♀, "N. Car." [U. S. N. M.]. 1 ♂, Black Mountains June, [A. M. N. H.]. 1 ♀, Valley

of Black Mountains, June 24 to 30, 1906; 2 ♀, Summit of Black Mountains, June 1 to 4, 1906, (Wm. Beutenmueller) [A. M. N. H.].

GEORGIA: 1 ♂, Burton, 1800 ft., May 21, 1911; 1 ♂, Clayton, 2000 ft., May 18 to 26, 1911, (J. C. Bradley), [C. U.].

FLORIDA: 1 ♂, "Florida" [U. S. N. M., ex Coquillett].

MINNESOTA: 1 ♀, "Minn.?" [U. of Minn.].

This species is closely related to *R. plumbeus* which see for a discussion of the differences. The two spots near the center of cell R_5 may be comparatively large and but narrowly separated or smaller and somewhat widely separated. Occasionally a specimen occurs in which but one of the spots is present.

***Rhagio terminalis* Loew**

1861. *Leptis terminalis* Loew, Berl. Ent. Zeitschr., v, p. 317, No. 5.

1908. *Rhagio terminalis* Kertész, Cat. Dip., III, p. 312.

Brownish yellow; disc of mesonotum cinereous, lighter trivittate; abdomen with a blackish spot on each caudo-lateral margin of three terminal segments; a broad ring near tip of hind femora, tip of hind tibiae and the tarsi, fuscous; wings slightly infusate especially on tip, stigma usually well defined, dark brownish.

Male.—The following description is based on the two type specimens in the Museum of Comparative Zoology at Cambridge, Mass.: Length, 9 mm. Head: Face and frontal triangle whitish pollinose; palpi and proboscis yellow, with pale hairs; antennae yellowish, the first segment often brownish; bristle brownish.

Thorax: Mesonotum blackish, more or less distinctly marked with two median grayish pollinose stripes and the lateral and posterior margins more or less paler; with short black hairs becoming longer on lateral margins; humeral calli pale; scutellum yellowish with moderately long black hairs; humeri for most part blackish, lightly dusted with gray pollen, yellowish on sclerites in region of wing base; halteres pale yellowish, extreme tip of knob slightly infuscated.

Abdomen: Yellowish to brownish yellow; a large black spot on the cephalo-lateral margin of each of the last three segments; last three segments of the venter almost wholly black; dorsum thickly clothed with short recumbent black hairs which are longer and erect on the lateral margins.

Legs: Front coxae wholly yellowish, the others yellowish and brownish but may be wholly yellowish; remainder of legs yellowish with a broad ring near apex of hind femora, the tip of front femora sometimes slightly, and the apex of the hind tibiae, and the tarsi brownish to blackish.

Wings: Membrane faintly suffused with grayish, more prominent at apex; costal cell tinged with yellowish; veins brownish; stigma elongate, light to dark brownish.

Female.—A single specimen in the Academy of Natural Sciences of Philadelphia Collection I believe is the female of this species. There seems to be only the usual sexual differences from the male.

Types.—The type material consists of two males, one labelled "Loew, Type, N. Y.," the other "Loew" but with no locality.

Specimens Examined: 20; 19 males, 1 female.

NEW YORK: 1 ♂, labelled "Type. Loew [M. C. Z.]. 1 ♂, Taghanic, July 4, 1920, (M. D. Leonard), [C. U.]. 1 ♂, Ithaca, July 14, 1890, [C. U.]. 1 ♂, East Aurora, July 18, 1909, (M. C. Van Duzee), [Van Duzee]. 1 ♂, Valcour Island, Lake Champlain, July 27, 1913, [A. N. S. P., ex Harbeck].

PENNSYLVANIA: 1 ♂, [A. N. S. P., abdomen lacking but it has been determined as *terminalis* Lw.]. 1 ♀, probably from Pennsylvania, [A. N. S. P.]. 2 ♂, Camp Hill, May 31, 1909, (C. S. Anderson), [Pa. Dept. Agr., determined as *scapularis* Lw.]. 1 ♂, Inglenook, June 8, 1917, (H. B. Kirk), [Pa. Dept. Agr.].

VIRGINIA: 1 ♂, [A. N. S. P.].

KENTUCKY: 1 ♂, Ashland, May 28, 1899, [Hine].

INDIANA: 3 ♂, Lafayette, June 30; 1 ♂, July 3, [U. S. N. M., ex Aldrich].

OHIO: 1 ♂, Medina, July 11, 1899, [Hine]. 1 ♂, June 29, 1907, [Ohio Agr. Exp. Sta., determined as *scapularis* Lw.].

(?) WISCONSIN: 2 ♂, one labelled "Wisconsin" the other "Milw." (? equals Milwaukee), [A. M. N. H., ex Wheeler; both of which I doubtfully determine as *terminalis* Lw.].

In addition to the above are the following without any locality whatsoever: 1 male, labelled "Loew" [M. C. Z.]; 1 male [A. N. S. P.]; 1 male, [Cornell Univ.]; 2 males, [U. S. N. M., ex Walton, nos. 196 and 187 which are typical specimens of *terminalis*].

This seems to be a fairly well defined species. It seems, however, to have been confused in collections with *R. scapularis* (= *vertebratus* Say) in several instances. The abdominal spots in a few cases are more or less united on the median line and occasionally there is a general darkened area over this whole region.

The two specimens from Wisconsin were picked out of a series of *R. vertebratus* received from the American Museum of Natural History. These I place provisionally in this species although the abdominal spots are rather broadly united on the median line and there are lateral spots in one specimen on segment four and in the other on segments three and four somewhat different in shape than in more typical specimens. The coxae are wholly yellow.

***Rhagio vertebratus* Say** (Pl. II, fig. 13)

1823. *Leptis vertebrata* Say, Jour. Acad. Nat. Sci. Phila., III, p. 38. No. 8.

1861. *Leptis hirta* Loew, Berlin. Ent. Zeitschr., v, p. 318, no. 21.

1861. *Leptis scapularis* Loew, Berl. Ent. Zeitschr., v, p. 318, no. 22

1908. *Rhagio hirtus* Kertész, Cat. Dip., III, p. 305.

1908. *Rhagio scapularis* Kertész, Cat. Dip., III, p. 310.

1908. *Rhagio vertebratus* Kertész, Cat. Dip., III, p. 314.

Thorax blackish in male, usually yellowish in female; abdomen yellowish, variously marked with blackish somewhat as follows: broadly banded with black; with a median row of spots basad, bands apicad; spots extended laterally to form bands; basal two or three segments sometimes unmarked; legs yellowish, the tarsi, a ring near apex of front femora, and apex of hind femora and tibiae usually blackish; wings nearly hyaline, stigma usually distinct.

Male.—Length, 7 to 10.5 mm. Head: Frontal triangle blackish in ground color, light gray to whitish pruinose; sides of face with moderately long and fairly abundant whitish hairs; proboscis and palpi dark brownish thru brownish to yellowish, the latter with fairly long and abundant whitish hairs; antennae with first two segments and arista blackish, the third yellowish and with often the tip of the second the same color, occasionally the third segment wholly or all except the base blackish.

Thorax: Blackish in ground color; mesonotum slightly so on disc but nevertheless lightly grayish pruinose, in the better preserved specimens usually with light gray pruinosity as two stripes and sometimes a third faint one on median line between these, the lateral borders broadly and when viewed from the front the hind border before scutellum also; hairs black, short on disc, somewhat longer and thicker on sides; humeral calli pale grayish; scutellum brownish yellow, usually darker along cephalic border; hairs moderately long and thick; pleura grayish pollinose, metanotal hairs pale.

Abdomen: Yellowish, marked with dark brownish or blackish in a variable manner as follows: the last three segments nearly always have each a broad band extending to lateral margins and usually leaving only the narrow caudal margin yellowish; the antepenultimate band often emarginate behind or sinuate; the remaining segments fall into two more or less well defined types as follows:

(1) (*vertebratus* type). Each with a median somewhat rounded spot, on the first segment small and just below scutellum or the segment may be nearly all black, sinuate behind and broadly reaching caudal margin on either side; the spots on segments two to four successively larger, sometimes extended laterad along cephalic border to form a partial band which on segment four often reaches the lateral margin; lateral margins narrowly edged with black.

(2) (*hirtus* type). First segment immaculate, segments 2-4 with broad basal bands rather than spots, although segment two is often immaculate also or the band may not reach the lateral borders or may even be further reduced to a quadrate spot; hairs moderately long and thick, more erect, longer and pale on sides; venter yellow, last three segments black.

Legs: Blackish, gray pollinose or the front pair pale yellowish, front pair sometimes intermediate in color and middle and hind pairs sometimes partly tinged with brownish yellow, hairs pale; femora yellowish, hind pair usually with apical third or half blackish, front pair often with a more or less distinct blackish ring near apex; tibiae yellowish, hind pair dirty yellowish, to brownish usually darker

towards apex; tarsi infuscated, metatarsus of first two pairs usually lighter except on tip.

Wings: Veins brownish; membrane very faintly tinged with grayish, slightly more pronounced on apex, along costal border yellowish; stigma elongate, pale to dark brownish.

Female.—Length, 7 to 9 mm. Similar to male except as follows: Head: front blackish in ground color, satiny whitish pruinose; antennae except arista, wholly yellowish, with first two segments or first segment only, brownish or blackish.

Thorax: More or less brownish on disc, broadly pale yellowish on lateral and often on posterior margins, as in male, sometimes two faint median yellowish vittae apparent; pleura yellowish to a somewhat variegated brownish and yellowish, the lighter color mostly confined to the region below the wing attachment, somewhat grayish pollinose.

Abdomen: Usually immaculate on first segment, sometimes with a subquadrate spot, remaining segments usually broadly banded with black (sometimes brownish) much as in *hirta* type of male but on anterior segments usually more nearly complete, bands sometimes emarginate caudad on one or more segments near the apex.

Legs: Front coxae pale yellowish, middle and hind pairs concolorous, to brownish, or variegated brownish and yellowish, often light gray to whitish pruinose; legs otherwise as in male.

Specimens Examined: About 428 males and females.

NEW BRUNSWICK: 1 ♂, Newcastle, July 16, 1915, (A. B. Baird), [New Brunswick Dept. Agr.].

NOVA SCOTIA: 2 ♀, West River, July 23, 1913, [C. U.].

QUEBEC: 1 ♂, 1 ♀, Outremont, August; 7 ♂, 7 ♀, Joliette, July, 1916; 3 ♂, 3 ♀, St. Hilaire, June 22, 1919; 1 ♂, Rigaud, July 5, 1920; 1 ♂, Lauzon, July 4, 1919; 1 ♀, Montreal, June, (all Ouellet), [all Ouellet]. 2 ♂, [A. N. S. P.]. 1 ♀, Vaudreuil County, [Kansas]. 1 ♀, Aylmer, July 31, 1926; 1 ♂, Aug. 3, 1926; 1 ♂, Wakefield, August 2, 1927, (F. P. Ide); 1 ♀, Cascades, July 11, 1920, (H. J. Crawford), [all C. N. M.].*

ONTARIO: 2 ♂, Burlington, June, 1919, (H. C. Hockett), [Leonard]. 1 ♀, Severn River, August 4, 1913, (H. C. Hockett), [Ont. Agr. College]. 1 ♀, Ottawa, June 30, 1912, (E. P. Van Duzee), [Van Duzee]. 1 ♂, Ridgeway, July 15, 1917, (M. C. Van Duzee), [Van Duzee]. 1 ♂, 1 ♀, Bruvelles, July 7, 9, 1913, (W. A. Ross); 1 ♀, Ottawa, July 16, 1913; 1 ♀, Aug. 4, 1912, (J. I. Beaulne); several ♂ and ♀, Jordan, July, (W. A. Ross); several ♂ and ♀, Bowmanville, July, (W. A. Ross); 1 ♀, Orillia, July 30, 1924, (H. L. Viereck); 1 ♀, Strathroy, July 1, 1925, (H. F. Hudson), [all C. N. M.].

MAINE: 4 ♂, Capens, July 11, 14, 17, 19, 1907; 2 ♀, July 16, 1907, [B. S. N. H.].

NEW HAMPSHIRE: 1 ♂, 1 ♀, Franconia, [B. S. N. H.]; 4 ♂, [A. M. N. H., ex Slosson]; 2 ♂, 2 ♀, (A. T. Slosson), 1 ♀, (Morrison); 2 ♂, July 10, 17, 1915, (C. H. T. Townsend), [U. S. N. M.]. 2 ♂, Glen House, July 26, 1916, [B. S. N. H.].

* Recorded from Rigaud, Montreal, East Bolton, and Quebec by Chagnon in List Dip. Quebec.

1 ♂, Hanover, July 3, [B. S. N. H.]. 2 ♂, Milford, July 23, 1914, [B. S. N. H.]. 1 ♀, Mount Washington, July 28, 1915, [B. S. N. H.]. 3 ♂, [A. M. N. H., ex Slosson]. 1 ♂, Mount Washington; 2 ♀, White Mountains, (one collected by Morrison), [U. S. N. M.]. 8 ♂, Mt. Washington, 2250 ft., July 24 to 25, 1912, [Johnson].

VERMONT: 1 ♀, Burlington, July 24, 1906, [B. S. N. H.]. 1 ♂, 2 ♀, Mount Ascutney, July 11, 1908; 1 ♂, July 23, 1912, [B. S. N. H.]. 1 ♂, Stratton, (P. W. Whiting), [B. S. N. H.].

MASSACHUSETTS: 1 ♂, Chester, Aug. 5, 1 ♂, Aug. 4, 1911; 2 ♀, July 4, 1911; 3 ♀, July 26, 1913; 4 ♂, Babish Falls, June 27, 1912; 1 ♂, July 26, 1912; 1 ♀, June 28, 1912; 1 ♀, Mount Greylock, August 8, 1907; 2 ♂, Great Barrington, June 15, 16, 1915, [all B. S. N. H.]. 2 ♂, Cummington, July 2-5, 1899, [U. S. N. M.]. 2 ♀, Cheshire, July 21, 1912, [Johnson]. 1 ♂, New Lenox, July 24, 1912, [Johnson].

CONNECTICUT: 1 ♂, Norfolk, July 13, 1915, (M. P. Zappe), [Conn. Agr. Exp. Sta.].⁵⁰

NEW YORK: 1 ♂, Upper Ausable Lake, July 30, 1920, (J. Bequaert), [A. M. N. H.]. 1 ♀, pond at foot of Mount Redfield, July 25, 1920, (J. Bequaert), [A. M. N. H.]. 1 ♂, Chazy Lake, June 28, 1913, [N. Y. S. M.]. 1 ♂, Onteora Mountain, Greene County, 2500 ft., July 11, 1897 (L. O. Howard), [U. S. N. M.]. 1 ♀, Newport, July 8, 1905 (D. B. Young), [N. Y. S. M.]. Adirondack Lodge, July (M. D. Leonard), [N. Y. S. M.]. Augur Flats, July, (D. B. Young), [N. Y. S. M.]; 2 ♂, Hamburg, June 21, 1908 and June 20, 1909, (M. C. Van Duzee), [Leonard, ex Van Duzee]. 1 ♂, East Aurora, June 15, 1918; 1 ♀, July 8, 1909, (M. C. Van Duzee), [Van Duzee]. 2 ♀, Colden, July 3, 1910, (M. C. Van Duzee), [Van Duzee]. 1 ♀, Protection, July 18, 1915, (M. C. Van Duzee), [Van Duzee]. 1 ♂, Gowanda, June 27, 1909, (M. C. Van Duzee), [Van Duzee]. 1 ♀, Niagara Falls, July 31, 1910, [C. U.]. 1 ♂, Little Valley, June 10, 1912; 1 ♀, June 30, 1912, (M. C. Van Duzee), [Van Duzee]. Sacandaga River, Fulton County, June 27, 1910, (C. P. Alexander), [C. U.]. 1 ♂, 1 ♀, Woodworth's Lake, Fulton County, (C. P. Alexander), [C. U.]. 9 ♂, 1 ♀, McLean, July 3, 1920, (M. D. Leonard), [Leonard]. 1 ♂, Ithaca, July 8, 1916, (R. C. Smith), [Kansas]; 1 ♀, June 25, 1890, [C. U.]; 4 ♀, July 1 to 7, [Banks]; 1 ♀, July 19, 1897, (C. M. Reynolds), [C. U.]. 3 ♂, Catskill Mts., June 25, 1904 and August 1, 8, 1904, [A. N. S. P.]. 1 ♀, Stony Clove, Catskill Mountains, July 1910, [A. N. S. P.]. 1 ♂, Staten Island, June 7, (Wm. T. Davis), [Davis].

NEW JERSEY:⁵¹

PENNSYLVANIA: 1 ♀, East Bolton, July 23, 1911, (A. F. Winn), [C. N. M.]. 2 ♂, Castle Rock, June 16, 1901; 1 ♂, June 1, 1902; 1 ♂, June 8, 1904; 1 ♀, June 5, 1910, (Harbeck), [U. S. N. M., ex Aldrich]; 1 ♂, June 10, 1905; 1 ♀, June 7, 1906, (C. T. Greene), [Pa. Dept. Agr., ex. Daecke]; 7 ♂, 7 ♀, June 3, 1906, to

⁵⁰ Recorded by Johnson (1925: 105) from the Litchfield "Area" and as occurring also in the rest of the State.

⁵¹ Recorded in Smith's List Ins. N. J., ed. 3, p. 743, (1910), from Dunfield, Delaware Water Gap, as *hirta*.

June 4, 1911, [A. N. S. P.]. 1 ♀, Roxboro, June 12, 1909, (C. T. Greene), [Banks]; 2 ♂, June 3, 1909, [Hine]; 1 ♀, June 29, 1908, (C. T. Green), [Pa. Dept. Agr.]; 1 ♂, May 31, 1908, [A. M. N. H., ex Bequaert; as *hirta*], 1 ♀, June 7, 1908, (Harbeck), [U. S. N. M., ex Aldrich]. 2 ♂, 1 ♀, Roxboro, May 31 and June 20, 1908, (F. Haimbach), [A. N. S. P., ex Haimbach]. 1 ♀, Delaware Water Gap, July 1, [A. M. N. H., ex Slosson]. 2 ♀, Philadelphia, July 6, 1891, [one Leonard, and one U. S. N. M.]; 2 ♀, June 18, 1890; 1 ♂, June 10, 1906, (F. Haimbach), [A. N. S. P.]; 2 ♂, June 18, 1895 [C. U.]. 1 ♀, Linglestown, July 4, 1919, [Johnson]. 2 ♂, Hummelstown, June 5, 1912; 1 ♂, June 6, 1912; 1 ♂, June 10, 1917; 1 ♂, June 7, 1912, (all J. N. Knull), [Pa. Dept. Agr.]. 1 ♀, Germantown, Philadelphia, May 4, 1905; 1 ♀, Swarthmore, Delaware County, June 19, 1910, (E. T. Cresson, Jr.), [A. N. S. P.]. 5 ♂, Harrisburg, June 7 to 24, and July 4; 2 ♀, June 12; 1 ♀, July 6, (W. R. Walton), [U. S. N. M., ex Walton]; 1 ♀, June 17, (A. B. Champlain), [U. S. N. M., ex Walton]; 1 ♂, July 7, 1910, (H. B. Kirk), [Pa. Dept. Agr.]. 1 ♂, Perdix, June 8, 1913, [Pa. Dept. Agr., ex Daecke]. 1 ♂, Enola, June 7, 1909, [Pa. Dept. Agr., ex Daecke]; 1 ♂, June, (W. R. Walton), [U. S. N. M., ex Walton]. 1 ♂, Inglenook, June 4, 1911, [Pa. Dept. Agr., ex Daecke]; 1 ♂, June 8, 1911, (H. B. Kirk), [Pa. Dept. Agr., ex Daecke]. 1 ♀, Glenolden, June 13, 1906, (Dr. Castle), [Pa. Dept. Agr., ex Daecke]. 2 ♂, New Cumberland, June 23, [U. S. N. M., ex Walton]. 2 ♂, Camp Hill, May 31, 1909, (Chas. Anderson), [Pa. Dept. Agr.]. 1 ♂, Allegheny, May 31, 1891; 1 ♀, July 2, 1891, [U. S. N. M., ex Aldrich]. 2 ♂, 1 ♀, Jeanette, [U. S. N. M., ex Aldrich]. 1 ♂, Stoverdale, June 16, 1916, (W. S. Fisher), [U. S. N. M., Div. Forest Ins.]. 1 ♀, 1 ♂, Hazleton June 28, 1909 and July 16, 1913, (G. W. Dietz), [A. N. S. P., ex Dietz]. 1 ♀, Riverview, June 18, 1912, [Pa. Dept. Agr.]. 1 ♂, Marsh Run, June 3, 1911, [Pa. Dept. Agr.]. 1 ♂, 1 ♀, Endeavor, June 30, 1917, (H. B. Kirk), [Pa. Dept. Agr.].

MARYLAND: 4 ♂, Plummer's Island, June 19, June 17, 1906 and August 31, 1909, (W. L. McAtee); 1 ♀, July 7, 1909, (A. K. Fisher); 7 ♂, 6 ♀, May 23 to June 20, 1915 and 1916, (R. C. Shannon), [all U. S. N. M.]; 1 ♂, 1 ♀, (in copula) June 5, 1915, (J. C. Crawford), [U. S. N. M.]; 8 ♂, 4 ♀, May 19 to June 8, 1912-1916 (H. L. Viereck) and (W. L. McAtee), [Biol. Surv.]; 1 ♀, June 6, 1915, (R. C. Shannon), [Shannon]. 4 ♂, Forest Glen, May 31, 1914; 1 ♀, June 1, 1913, (F. Knab), [U. S. N. M.].

DISTRICT OF COLUMBIA:⁵²

VIRGINIA: 12 ♂, 10 ♀, Dead Run, Fairfax Co., May 23 to June 19, 1915, (R. C. Shannon), [U. S. N. M.]; 1 ♂, May 21, 1916; 1 ♀, June 9, 1913, (R. C. Shannon), [Shannon]; 3 ♂, 1 ♀, June 23, [Banks]. 2 ♀, near Plummer's Island, May 28, 1916, (H. L. Viereck) [Biol. Surv.]; 1 ♂, June 4, 1916, (R. C. Shannon), [Shannon]. 6 ♂, Chain Bridge, May 28 and June 23, [Banks]. 1 ♀, Alexandria County, June 18, 1910, (W. T. Davis), [Davis]; 1 ♀, June 18, 1910, [A. M. N. H., ex Slosson]. 2 ♂, Dixie Landing, May 25, [U. S. N. M., ex Aldrich]. 1 ♀, Bluemont, June 13, 1916, (J. N. Knull), [U. S. N. M., Div. Forest Ins.; as *hirta*].

WEST VIRGINIA: 1 ♀, Fairmont, June 22, 1908, (E. T. Cresson Jr.), [A. N. S. P.].

⁵² Recorded by Osten Sacken in Cat. Dipt. N. A., ed. 2, p. 64, (1878) from "Distr. Columbia" as *scapularis* Loew.

NORTH CAROLINA: 3 ♂, 2 ♀, Canton, June 1910, (Franklin Sherman), [N. Car. Dept. Agr.]. 2 ♂, Hendersonville, June 1907, (F. Sherman), [N. Car. Dept. Agr.]. 1 ♂, 2 ♀, Highlands, July 1907, (Franklin Sherman), [N. Car. Dept. Agr.]. 1 ♂, 2 ♀, Swannanoa, 3000 ft., Mid-July 1919, (R. W. Leiby), (F. Sherman), [N. Car. Dept. Agr.]. 1 ♀, Swannanoa Valley, May 24, [A. M. N. H.]. 3 ♂, Linville Falls, 4000 ft., late June, 1920, (F. Sherman), [N. Car. Dept. Agr.]. 1 ♂, Linville, July 17, 1903, (A. P. Morse), [Banks]. 2 ♀, Black Mountains, 1911, [A. N. S. P.]; 1 ♂, August 1912, (Wm. Beutenmuller), [A. M. N. H.]; 1 ♀, 5000 ft., July 18, 1919, (R. W. Leiby), [N. Car. Dept. Agr.]. 14 ♂, 5 ♀, Valley of Black Mountains, June 24 to 30 and July 7 to 26, 1906, (Wm. Beutenmuller), [A. M. N. H.]; 1 ♀, Summit of Black Mountains, July 2 to 5, 1906, (Wm. Beutenmuller), [A. M. N. H.]. 1 ♂, Blowing Rock, June 26, 1901, (Franklin Sherman), [N. Car. Dept. Agr.]. 1 ♀, Lake Toxaway, June 30, [A. M. N. H., ex Slosson; as *scapularis* Lw.]. 1 ♂, 3 ♀, North Carolina, (H. Morrison), [U. S. N. M.].

SOUTH CAROLINA: 1 ♂, 1 ♀, Spartansburg, June 5, 1917, [A. N. S. P.; as *hirta*].

TENNESSEE: 1 ♀, Knoxville, July 14, 1891, [U. S. N. M., ex Aldrich].

GEORGIA: 1 ♀, Pinnacle Peak, Rabun County, August 20, 1913, [Cornell]. 1 ♂, "S. Georgia," Morrison [U. S. N. M.].

FLORIDA: 1 ♀, Rock Bluff, Liberty County, April 4, 1927, (M. D. Leonard), [Leonard].⁵³

LOUISIANA: 1 ♂, 1 ♀, Opelousas, April, 1897, [C. W. Johnson].

OHIO: 2 ♀, Cincinnati, June 9 to 16, 1901, [Hine]. 1 ♀, Akron, May 22, [Hine]. 1 ♂, Hinkley, Medina County, June 28, 1901, [Hine]. 1, Ira, Summit County, [Hine]. 1, Vinton, June 19-22, 1901, [Hine]. 1 ♂, Wooster, July 19, 1920, (Q. Lowry), [N. H. Agr. College]. 1 ♀, "Ohio" July 8, 1907, [Ohio Agr. Exp. Sta.].

INDIANA: 2 ♂, 2 ♀, Lafayette, June 2, 1921; 4 ♀, June 30 to July 3, 1911, [U. S. N. M., ex Aldrich].

ILLINOIS: 1 ♂, Chicago, June 17, 1898, [Leonard, ex Brues]. 6 ♂, 6 ♀, Algonquin, June 7, 13, 1895, (Nason?), [U. of Ill.; No. 122]. 1 ♂, 3 ♀, Elizabeth, July 7, 1917, [U. of Ill.]. 1 ♂, "N. Ill." [U. S. N. M.]. 1 ♀, "Illinois" [A. M. N. H.].

MICHIGAN: 2 ♂, 1 ♀, Charlevoix, June 2, 1894, (Wolcott), [Nebraska]. 2 ♀, Whitmore Lake, July 3, 1917, (E. G. Anderson), [Shannon]. 1 ♂, 1 ♀, Onota Township, Alger County, July 30, 1916, (A. W. Andrews), [A. N. S. P.].

WISCONSIN: 5 ♂, 3 ♀, Beaver Dam, June 12 to 18, 1911, [A. N. S. P., ex Dietz]. 1 ♂, Milwaukee, July 27, 1890; 1 ♂, June 28, 1895, [A. M. N. H.]. 1 ♀, Polk County, July, [C. F. Baker]; 1 ♂, [U. S. N. M., ex Aldrich]. 1 ♀, Price County, August 13, 1897, [A. M. N. H.]. 2 ♀, "Wisc." [A. M. N. H.].

MINNESOTA: 2 ♂, Olmstead County, (C. N. Ainslee), [U. of Minn.; No. 22 sub. 127].

CALIFORNIA: 2 ♀, Mount Shasta District, [A. M. N. H.; is probably this species].

BRITISH COLUMBIA: 1 ♀, Mount Cheam, August 15, 1901, (J. Fletcher), [C. N. M.].

⁵³ Recorded by Johnson (1913: 54) from Ormond.

Notes on Types.—The Museum of Comparative Zoology at Cambridge, Mass., contains the following material:

R. hirtus Loew. A single male labelled "Ill. Loew" apparently in Loew's hand-writing, length 9 mm. This agrees very well with Loew's description.

R. vertebratus Say. I have, of course, not seen the type material of this species but it is worth recording that the Museum of Comparative Zoology has a male and a female, determined by Loew. The male, from New York, is labelled *vertebrata* with a query and the female, without a locality, was evidently only tentatively placed here also. The other specimen, a female without a locality from Osten Sacken's collection, and labelled by him *vertebrata*, bears on a slip of paper a note which is significant when considering the relation of this species to Loew's *hirta*. It is as follows: "Was sent to me by Loew several years ago under this name but doubtingly. I believe he would call it *hirta* now?"

Notes on Synonymy.—After having studied the type material of *R. hirtus* Lw., and *scapularis* Lw., in connection with the description of *L. vertebratus* Say and over four hundred specimens of both sexes from all the localities listed above I can come to no other conclusion but that they all belong to one and the same species. Say's name, *vertebratus*, being the oldest takes priority. Mr. C. W. Johnson also concurs with me in this opinion.

It is interesting to note that the males which have the more typically spotted abdomen also have the front coxae, almost without exception blackish, thus agreeing with Say's description of *vertebratus* while those males in which the abdomen is banded rather than marked with a series of spots almost always have the fore coxae pale yellowish, thus agreeing with the description of *hirtus* Loew. However, there are occasionally exceptions to be met with and this coupled with the fact that the females are all of the banded abdomen type is further argument for combining these species.

CHRY SOPILUS Macquart

1763. (?) *Styrex* Scopoli, Ent. Carniol., p. 367.
 1782. *Sylvicola* Harris, Expos., Eng. Ins., p. 100.
 1826. *Chrysopilus* Macquart, Rec. Trav. Soc. Sci. Agr. et Art. Lille, 1825, p. 403.
 1834. *Chrysopila* Macquart, Hist. Nat. Ins., Dipt., I, p. 429.
 1848. *Leptis* Walker, List Dipt. Brit. Mus., I, p. 213.
 1857. *Heliomyia* Doleschall, Natuurkund. Tijdschr. Nederl. Indie, (Ser. 3, IV) XIV, p. 402.

Small to rather large flies; body usually black in ground color, frequently yellowish or golden tomentose; eyes of males contiguous usually broadly so (except in *C. rotundipennis* Loew which has them separated by the width of the ocellar tubercle), face of the male with the sides concave especially above; front of the females at least as wide as one eye, usually wider (less than width of one eye in *rotundipennis*); eyes usually with a more or less well defined area on the lower part of smaller facets which is frequently set off from the larger facets by somewhat of a groove; antennae with third segment onion-shaped or conical, with a slender terminal arista which is usually longer than the rest of the antenna; tibial spurs 0 : 2 : 1; wings with fourth posterior cell open, the anal cell closed and almost always distinctly petiolate.

Key to Species of Chrysopilus

1. Wings practically hyaline except for the stigmal spot or in some cases at tip, or almost evenly tinged with brownish or grayish (the latter small Western species).....2
 Wings almost wholly heavily darkened (large Eastern species), or clouded or spotted in various ways.....14
2. First antennal segment greatly swollen as in *Symphoromyia*, longer than the second and third together and with dense long black hairs above and below (Cal.).....**dilatus** Cress.
 First antennal segment normal, little larger if any than the second or third and either bare or with short hairs, rarely with hairs long and dense.....3
3. Abdomen velvety black with silvery or golden tomentose bands which may be narrowly interrupted on the median line.....4
 Abdomen usually blackish but sometimes paler; if yellowish or golden tomentum is present it is more evenly distributed, not arranged in bands.....6
4. Front femora with at least basal part darkened; stigmal spot usually distinct, dark brown; knob of halteres more or less infusate; front of female dull, a grayish satiny in certain lights.....5
 Front femora wholly yellowish; stigmal spot pale brownish yellow; knob of halteres yellowish; front of female shining black; a larger species,

ornatus (Say)

5. Wings wholly hyaline, except for stigmal spot; a smaller species, 7.5-9.5 mm.
fasciatus Say
 Wings with first and second submarginal cells from base of stigma to tip infuscated; a larger species, 9-13 mm. **fasciatus** var. **infuscatus** n. var.
6. First antennal segment with numerous long black hairs; wings distinctly tinged with brownish, (N. Western States) **tomentosus** Big.
 First antennal segment practically bare. 7
7. Wings noticeably broad, rounded at the apex; arista pubescent; a pale species, thorax and abdomen not darker than a yellowish brown; abdomen not banded nor is it noticeably yellowish towards base; eyes of male separated by width of ocellar tubercle. **rotundipennis** Lw.
 Wings more normal, not noticeably broad and rounded; arista bare; body usually blackish in ground color but in one species almost wholly brownish or noticeably yellowish towards base; eyes of male contiguous. 8
8. Femora black. 9
 Femora yellowish or more or less brownish. 13
9. Wings hyaline, stigma pale yellowish and but little differentiated; a larger species, 7-9.5 or 10 mm. **proximus** Walk.
 Wings at least slightly, to strongly tinged with grayish or brownish, stigma brownish, distinct; smaller species, 4.5-5.5 mm. 10
10. Mesonotum and abdomen noticeably clothed with rather long and rather dense, appressed, silvery white hairs. **pilosus** n. sp.
 Mesonotum and abdomen without such hairs. 11
11. Sides of face bare. 12
 Sides of face with fine yellowish hairs on lower half. **flavibarbis** Adams
12. Wings strongly tinged with grayish or brownish; an opaque black species with a noticeably erect dirty yellowish white pile. **humilis** Lw.
 Wings but faintly tinged with grayish or brownish; a more brownish than blackish species and with piles parse. **nudus** Cress.
13. Abdomen uniform blackish; stigmal spot pale yellowish; in the better preserved specimens fine dense golden tomentum on abdomen and mesonotum, usually mostly rubbed off; femora pale yellowish; halteres wholly yellowish (N. Western States) **testaceipes** Big.
 Abdomen yellowish towards base, remaining segments usually dark brownish, narrowly bordered with yellowish caudad (♂), or abdomen almost uniform brownish (♀); stigmal spot more distinct, usually dark brown; abdomen and mesonotum with golden tomentum but not as dense as in above species; femora yellowish to brownish yellow, at least hind pair usually darkened toward tip; knob of halteres distinctly infuscated (Middle-western and Eastern States) **modestus** Lw.
14. Wings a smoky brown, usually darker along costal border and along veins. . . 15
 Wings clouded or spotted in various ways with brown or black. 18
15. Mesonotum entirely velvety black. 16
 Mesonotum with dense golden tomentum. 17
16. Abdomen entirely velvety black. **velutinus** Lw.
 Abdomen with two rows of tufts of silvery tomentum. **connexus** Johns.

17. Abdomen entirely velvety black.....**davisi** Johns.
Abdomen with two rows of tufts of silvery or pale yellowish tomentum
thoracicus Fab.
18. Wings hyaline, the veins and membrane blackened at extreme base
basilaris Say
Wings otherwise marked19
19. Both longitudinal veins and cross-veins distinctly and heavily bordered with brownish, costal and first basal cells wholly, and sometimes most of the radial cell, brownish; a smaller species, 7.5-11 mm.....**foedus** Lw.
Wings marked in a similar manner but much more faintly so; a larger species, 9-15 mm.....**andersoni** n. sp.
Wings otherwise marked, a smaller species, not over 7-8 mm. at most.20
20. Wings clear with stigma distinct, dark brown; veins bordered with dark brown as follows: the bend of the fork of the anterior branch of the third vein, those forming the apex of the discal and second basal cells, and the base of the third vein to the radiomedial cross-vein and that cross-vein; (S. E. States).....**griffithi** Johns.
Wings almost clear or more or less tinged with pale brownish especially on basal half, a more or less well defined subquadrate darker brown spot in the middle, extending from the stigma through the discal cell; the wings and body both darker in the male than the female but the central spot in the wing is still indicated by a still darker area (widely distributed through Eastern and Middle Western States).....**quadratus** Say

I have not included in the above key *anthracinus* Bigot, *bellus* Adams, and *lucifer* Adams, since I have been unable, as yet, to definitely identify these species.

Chrysopilus andersoni new species

Related to *C. foedus* Lw., but larger and wing veins more faintly bordered; blackish, the better preserved specimens with mesonotum and abdomen more or less thickly clothed with whitish (♂) to a reddish golden (♀) tomentum; legs brownish yellow, basal half to two-thirds of femora darker.

Male.—Length 9 to 10 mm. Head: As in *foedus* but eyes usually almost contiguous, never separated by a space as wide as one-half width of frontal tubercle.

Thorax: As in *foedus* but tomentose hairs somewhat longer and more silvery, never with a yellowish cast.

Abdomen: As in *foedus*.

Legs: As in *foedus*, except that hind femora also are darkened on basal half or two thirds.

Wings: Veins brownish and most of them faintly bordered with brownish, a little more noticeably so on cross-veins; stigma brownish, but not very strongly marked.

Female.—Length, 12 to 15 mm. Similar to male except as follows: hairs on side of face usually somewhat shorter and with a brownish tinge; front, vertex, and face in some lights satiny brown; veins of wing more distinctly bordered with brown, sometimes almost as distinctly as in *foedus*.

Described from 39 specimens, 23 ♂ and 16 ♀ as follows:

Holotype.—Male; Harrisburg, Pennsylvania, June 7, 1912 [Pa. Dept. Agr.].

Allotype.—Female; taken in coitu with above [Pa. Dept. Agr.].

Paratypes, listed by States as follows:

PENNSYLVANIA: 1 ♂, Camp Hill, June 12, 1916, (C. S. Anderson), [C. S. Anderson]; 1 ♂, 1 ♀, June 2, 1911, (H. B. Kirk), [U. S. N. M.]; 1 ♂, 1 ♀, June 3, 1911, (W. S. Fisher), [U. S. N. M.]; 2 ♀, June 2, 1911 [Pa. Dept. Agr.]; 1 ♂, June 10, 1923, (C. S. Anderson), [Johnson]. 2 ♂, Lewisburg, July 4, 1916, [Pa. Dept. Agr.]. 1 ♂, Enola, June 13, 1906, (W. R. Walton), [U. S. N. M., ex Aldrich]; 2 ♂, [Pa. Dept. Agr.]. 2 ♂, 3 ♀, Allegheny, June 1890, 1891, [U. S. N. M., ex Aldrich]; 1 ♀, [U. S. N. M.]. 1 ♂, Pittsburg, (Ehrmann), [U. S. N. M., ex Aldrich]. 1 ♀, Waynesboro, June 1916, (S. S. Dickey), [U. S. N. M.]; 1 ♂, [A. L. Melander]; 2 ♀, (Klages), [U. S. N. M., ex Aldrich]; 2 ♂, [Pa. Dept. Agr.].

OHIO: 2 ♂, Columbus, June 2, 1915, (Don B. Whelan), [Mich. Agr. College]; 1 ♀, [Hine]. 2 ♂, Dayton, July 7, 1915, (R. C. Smith), [Leonard, ex Kansas]. 1 ♂, Vinton, July 5 to 12, 1900, [Hine]; 1 ♀, [M. C. Z., ex. Loew. Coll.].

INDIANA: 2 ♂, Lafayette, June 16, 1915, (J. M. Aldrich), [U. S. N. M., ex Aldrich]. 1 ♂, Wells County (E. B. Williamson).

ILLINOIS: 1 ♂, 2 ♂, "Ill." [M. C. Z.; the ♀ labelled "limbatum?? par Wlk." Loew's hand-writing].

I was at first inclined to call this species merely a larger, more Eastern form of *C. foedus* Lw., in which the wing markings were paler. Mr. C. W. Johnson, however, called my attention to specific differences in specimens in the collection of Mr. C. S. Anderson and requested that I name the new species in honor of Mr. Anderson who had collected this material.

I believe that *C. andersoni* can be distinguished from *foedus* by its somewhat larger size, the paler wing markings and the somewhat darker hind femora. It also has a more Eastern distribution.

In the Museum of Comparative Zoology at Cambridge, in the Loew collection of *C. foedus* are two males and a female labelled

"Ill., Loew", another female has the label in Loew's handwriting "limbatam?? par Wlk." This and the other three specimens I consider to be *andersoni* and have labelled them as paratypes. The Ohio specimen is about the size of a typical *foedus* but the rest are a little larger. Loew evidently recognized that these were distinct but probably hesitated to describe them as new since the specimens are badly rubbed.

***Chrysopilus anthracinus* Bigot**

1887. *Chrysopila anthracina* Bigot, Bul. Soc. Zool. France, XII, p. 105.

1908. *Chrysopilus anthracinus* Kertész, Cat. Dipt., III, p. 317.

This species has not been recognized since it was originally described by Bigot. The following is a translation of his description:

"Length, 5.5 mm.

"♂. Wholly opaque black, almost bare. Wings pale fuscous, on the outside broadly, more obscure, stigmal spot oblong, fuscous.

"Entirely of an opaque black with very thick set blackish hairs; antennae and palpi with long black hairs; wings of a distinct brownish, a little more clouded on the distal part, stigmal spot elongate, oblong, brown; anal cell of the wings closed before the border.

"California. 1 specimen."

***Chrysopilus basilaris* Say (Pl. III. fig. 30)**

1823. *Leptis basilaris* Say, Jour. Acad. Sci. Phila., III, p. 36.

1878. *Chrysopila basilaris* Osten Sacken, Cat. Dipt. N. Am., 2nd ed., p. 63.

1908. *Chrysopilus basilaris* Say, Kertész, Cat. Dipt., III p. 320.

Brownish black to blackish; eyes large; thorax and abdomen sparsely clothed with golden tomentum; halteres more or less yellowish with knobs blackish; legs dark brownish or blackish, except extreme tip of femora, the tibiae and tarsi except tips, which are yellowish; wings clear, the veins pale *except at extreme base where both are dark brownish or blackish*; stigmal region somewhat yellowish.

Male.—Length 4 to 5.5 mm. General color brownish black to blackish. Head: Eyes dark reddish to blackish; antennae brownish, whitish pollinose; face and proboscis covered with grayish pollen; face bare; ocellar triangle blackish, prominent, a few stout black hairs on hind part. Head proportionately somewhat larger than in many other *Chrysopili* and a little wider than the thorax. Eyes contiguous for at least a distance equal to the length of the ocellar triangle.

Thorax: Mesonotum often with three rather indistinct darker stripes, the median one very narrow; sparsely clothed with short golden tomentum; halteres with stem yellowish or brownish yellow, knobs blackish.

Abdomen: Blackish, sparsely clothed with short golden tomentum which at base and on sides is longer and more silvery or yellowish.

Legs: Coxae, trochanters, femora, except extreme tip, and last tarsal segment blackish or dark brown, remainder of legs yellowish.

Wings: Membrane hyaline; veins pale; membrane slightly thickened and yellowed in stigmal region; at extreme base of wing the membrane and the veins are dark brownish or blackish as indicated in figure.

Female.—Length, 5 to 5.5 mm. Front dark brownish; on either side of vertex slightly behind ocellar triangle and just inside margin of eye is a patch of moderately long, stout, blackish hairs; another patch occurs slightly below ocellar triangle on either side just inside margin of eye; a third pair covers most of the front just above the antennae; a few similar hairs on ocellar triangle just back of each of the two rear ocelli; front, face and labellum more or less distinctly grayish pollinose; otherwise the female is similar to the male.

Specimens Examined: About 112 males and females.

NEW HAMPSHIRE:⁵⁴

VERMONT:⁵⁴

MASSACHUSETTS: 1 ♂, 1 ♀, Beverley, June 13, 1869, [U. S. N. M.]. 1 ♂, Manomet, July 21, 1905, [Leonard]. 3 ♂, Woods Hole, Aug. 9, 1899, (A. M. N. H.).⁵⁴

RHODE ISLAND: 1 ♂, Newport, [A. N. S. P.].

CONNECTICUT: 1 ♀, New Haven, July 31, 1910, (B. H. Walden), [Conn. Agr. Exp. Sta.]; 1 ♂, July 20, 1904, (W. E. Britton), [Conn. Agr. Exp. Sta.]; 1 ♂, July 16, 1911, (A. B. Champlain), [Walton].⁵⁴

NEW YORK: Hague, August, (M. D. Leonard), [N. Y. S. M.]. 1 ♀, Batavia, July 10, 1913, (H. H. Knight), [Leonard]. 1 ♂, 2 ♀, Spring Lake, Cayuga County, July 20, 1918, [C. U.]. 1 ♂, Ithaca (?) [C. U.]; 1 ♀, July 20, 1922, [C. U.]; 1 ♂, July 8, 1904, [R. I. Agr. College]. Poughkeepsie, July, (D. B. Young), [N. Y. S. M.]. 1 ♀, Mosholu, [A. M. N. H.]; 5 ♂, 2 ♀, [A. M. N. H.].

PENNSYLVANIA: 3 ♀, New Cumberland, July 3, 1909, [W. R. Walton]; 12 ♂, 2 ♀, July 3, 1909, (4 by E. Daecke), [Pa. Dept. Agr.]. 1, Delaware County, July 28, 1893, [U. of Ill.]; 1 ♂, July 23, 1893, [Brook. Mus.]; 3 ♂, [A. N. S. P.]. 1 ♂, Chester, July 25, 1895, [Brook. Mus.].

NEW JERSEY: 1 ♀, Ballinger's Mill, August 8, 1926, (H. C. Hallock), [C. U.]. 1 ♂, Fort Lee, July 4, 1904, [Pa. Dept. Agr.].

MARYLAND: 1 ♂, Linnieville, July 4, 1913, (R. C. Shannon), [U. S. N. M.]. 1 ♂, Chestertown, August 1, 1901, [A. N. S. P.]; 1 ♂, 1 ♂, [A. N. S. P.].

DISTRICT OF COLUMBIA: 1 ♂, 3 ♀, Chain Bridge, July 10, 19, 1912, (C. T. Greene), [U. S. N. M.].

VIRGINIA: 1 ♂, 1 ♀, Falls Church, July 4, [A. M. N. H.]; 1 ♂, June 27, 1912, (C. T. Greene), [U. S. N. M.]; 1 ♀, June 28, [N. Y. S. M.]. 1 ♀, July 3, [A. N. S. P.]. 1 ♀, Great Falls, July 20, 1913, (F. Knab), [U. S. N. M.]; 1 ♂, July 13,

⁵⁴ Recorded by Johnson (1925: 105) from the "Hampton Area," New Hampshire; from the "Brattleboro Area," Vermont; and from the "Boston, Plymouth, Cape Cod, and Bristol County Areas," Massachusetts, and from Connecticut.

(N. Banks), [U. S. N. M., ex Aldrich]. 1 ♂, Glencarlyn, June 30, (N. Banks), [U. S. N. M., ex Aldrich]. 2 ♂, Dyke, July 16, 1916, (W. L. McAtee), [Biol. Surv.]. 1 ♂, 4-mile Run, June 24, 1915, (L. O. Jackson) [Biol. Surv.].

NORTH CAROLINA: 2 ♂, 1 ♀, (Morrison), [U. S. N. M.]. 1 ♂, Valley of Black Mountains, June 24 to 30, 1906; 1 ♂, August 9, 1906, (Wm. Beutenmueller), [A. M. N. H.].

GEORGIA: 2 ♂, Tybee, June 25, 1912, (C. R. Crosby), [C. U.]. 1 ♂, Honey Island, Okefinokee Swamp, June 1, 1912, [C. U.]. 7 ♂ ♀, "S. Ga." (Morrison), [U. S. N. M.].

FLORIDA: 1 ♀, Biscayne Bay, [A. M. N. H., ex Slosson]. 1 ♂, 1 ♀, Lake Worth, [A. M. N. H., ex Slosson]. 1 ♀, Brickell's Hammock, Mangrove Swamp, Miami, March 5, 1916, (M. Hebard), [A. N. S. P.]. 2 ♂, Jacksonville, [A. M. N. H., ex Slosson]. 1 ♂, Atlantic Beach, [A. M. N. H., ex Slosson]. 1 ♀, Charlotte Harbor, [A. M. N. H., ex Slosson]. 1 ♀, St. Augustine, Mar. 15, (C. W. Johnson), [Leonard, ex Johnson]. 1 ♂, Pebbly Beach, Jacksonville, May 9, 1908, (C. W. Johnson), [A. M. N. H.].

ALABAMA: 1 ♀, Birmingham, June 4, 1917, (J. M. Aldrich), [U. S. N. M.].

MISSISSIPPI: 1 ♀, Biloxi, April 5, 1910, (F. M. Jones), [Pa. Dept. Agr.].

TEXAS: 3 ♂, 1 ♀, Waco, (Belfrage), [U. S. N. M.].

INDIANA: 1 ♀, Lafayette, July 19, (J. M. Aldrich), [U. S. N. M., ex Aldrich].

ILLINOIS: 1 ♂, 1 ♀, Muncie, July 5, 1914, [U. of Ill.].

* GUATEMALA, CENTRAL AMERICA: 1 ♀, Livingston, Feb. 18, 1905, (Chas. C. Dean); 1 ♂, Livingston, April 5, (Barber & Schwarz), [U. S. N. M.; cannot be separated from this species].

This is a very characteristic species and may be readily distinguished by its small size and the darkened base of the wings.

Chrysopilus bellus Adams

1904. *Chrysopila bella* Adams, Kans., Univ. Sci. Bul., II, p. 438.

1908. *Chrysopilus bellus* Kertész, Cat. Dip., III, p. 320.

I have not seen the types nor have I been able to refer as yet any Western *Chrysopili* to this species. A copy of the original description therefore follows:

"Male: Head black; occiput, frontal triangle, face and cheeks dusted with bluish gray pollen; pile sparse and white; antennae dark brown, the third joint lighter than the other two, proboscis yellowish, palpi brown, pile white; ocellar tubercle prominent. Thorax black; mesonotum with grayish brown pollen, that of the humeri and lateral margins gray, tomentum golden yellow; pleurae light gray pollinose, with light colored pile above front coxae and behind and below base of wings; scutellum grayish brown, covered with golden yellow tomentum; metanotum light gray pollinose, halteres yellow, knobs brownish black. Abdomen black; first segment light gray pollinose, in others, opaque black, and in others still the segments appear to be the former color on the apex and the latter on the base; pile

white tomentum golden yellow. Coxae blackish, apex with a yellowish cast; pollen light gray; femora and tibiae light yellow; tarsi yellowish at base, black at apex. Wings hyaline, anterior branch of third vein without stump.

"Female: Same as male except the antennae and palpi are darker, the abdomen is uniformly gray pollinose; knobs of halteres yellow, trochanters are blackish, and bend of anterior branch of the third vein is rectangular and with a stump. Length, 5.75-6 mm.

"Two male specimens from California and one female from Washington."

***Chrysopilus connexus* Johnson**

1912. *Chrysopilus connexus* Johnson, Psyche, XIX, p. 108.

Wholly velvety black, except extreme base of halteres which is pale brownish, and the tibiae wholly and the two or three basal tarsal segments which are yellowish; abdomen with two rows of tufts of silvery white hairs on posterior margins of segments one to five which are somewhat more conspicuous in the female than in the male; wings smoky brown, the veins bordered with darker brown as in *thoracicus* Fab. Length, male 11 to 12 mm., female 12 to 12.5 mm.

This species belongs to the velutinous group of *Chrysopilus* which is composed of *thoracicus* Fab., *davisi* Johns. and *velutinus* Loew. It comes close to the last. When the abdomen of *connexus* is badly rubbed it is sometimes difficult to distinguish it from *velutinus*. I believe however that in the better preserved specimens the longer hairs on the mesonotum and scutellum will usually serve to aid in separating this species from *velutinus*.

Holotype.—Male; Black Mountains, North Carolina, [U. S. N. M., No. 15450].

Allotype.—Female; as above.

Paratype.—Female; as above, [C. W. Johnson Collection].

Specimens Examined: 30; 10 males, 20 females.

NORTH CAROLINA: 1 ♀, Linville Falls, 4000 ft., (F. Sherman), mid-June, 1920; 1 ♂, 1 ♀ in coitu, 1 ♀, and 1 ♂ early June 1920, [all N. Car. Dept. Agr.]. 1 ♂, 2 ♀, Hot Springs, (A. T. Slosson), [A. M. N. H., ex Slosson; determined by Coquillett as *velutinus*]. 1 ♀, Junataska Mountain, Haywood County, June 18, 1920, (Wm. T. Davis), [Davis]. 4 ♂, 6 ♀, Black Mountains, [A. M. N. H.; three of the males are badly rubbed and may be *velutinus*]; 1 ♂, 4 ♀, [U. S. N. M.]; also the *holotype*, *allotype* and *paratype*.

FLORIDA: 2 ♂, 2 ♀, Jacksonville, [A. S. N. M.; determined by Coquillett as *velutinus*]; 2 ♀, [U. S. N. M.].

As C. W. Johnson (1912: 109), has pointed out the specimen figured by Howard in "The Insect Book," (1905: pl. 16, fig. 23) is *connexus*, not *velutinus*. This specimen is a female in the United States National Museum Collection. The two males from Raleigh, North Carolina, each have long erect yellowish hairs along the lateral border of the abdomen and moderately long, dense fine, blackish hairs on the mesonotum; on the scutellum these hairs are present also but longer and on one specimen are almost yellowish in certain lights; the females with hardly noticeable hairs on either thorax or abdomen.

Chrysopilus davis Johnson

1911. *Chrysopila davis* Johnson, Psyche, XIX, p. 4.

1912. *Chrysopilus davis* Johnson, Psyche, XIX, p. 108-109.

Velvety black; thorax with dense golden tomentum; legs black, except tibiae and metatarsi which are yellowish; wings blackish.

I have seen the holotype of this species in the collection of Mr. C. W. Johnson but as the original description seems to offer an accurate and concise diagnosis of the species I here quote it in full:

"*Female*. Head velvety black; antennae black. Thorax black, covered with a dense golden yellow tomentum, similar to *C. thoracica*; pleurae, scutellum and the entire abdomen velvety black. Femora black, tibiae and metatarsi light yellow; the remainder of the tarsi blackish. Halteres black. Wings smoky black. Length, 15 mm.

"Two specimens collected by Mr. Wm. T. Davis, Clayton, Georgia, "2000 ft.-3700 ft." June, 1900. *Holotype* in author's collection. This species seems to be intermediate between *C. velutina* Lw. and *C. thoracica* Fabr., the wings and abdomen are like the former and the thorax like the latter."

I have also examined a male from Rabun County, Georgia, July 19, determined by Mr. Johnson and in the collection of Wm. T. Davis.

Chrysopilus dilatus Cresson

1919. *Chrysopilus dilatus* Cresson, Proc. Acad. Nat. Sci. Phila., 1919, p. 177.

Dull blackish; *first antennal segment greatly swollen* and with dense long blackish hairs; tibiae and metatarsi brownish.

Male.—Length, 6 mm. Head: Antennae, proboscis and palpi blackish, the first segment of the antennae elongate and greatly swollen, suggestive, as Cresson says of *Symphoromyia*; palpi prominent and densely clothed with long black hairs; proboscis paler below and with rather sparse pale hairs; face grayish pollinose, lower part and occiput with rather long and rather dense pale hairs; ocellar tubercle prominent and with several long black hairs; eyes large and contiguous or nearly so.

Thorax: Mesonotum blackish to brownish black, two paler, rather ill defined stripes either side of the median line; rather sparse pale tomentum on sides; pleura grayish pollinose in spots with long pale hairs; scutellum with sparse blackish pile; halteres with knob fuscous, stem paler.

Abdomen: Blackish but somewhat brownish pollinose giving it a lighter appearance; with sparse pale hairs, longer on sides near base.

Legs: Coxae blackish, somewhat grayish or brownish pollinose, with a few long pale hairs; knees, tibiae and the greater part of the metatarsi brownish yellow, remainder dark brownish. Femora with a few pale hairs.

Wings: Membrane uniformly very slightly cloudy; veins brownish; stigmal spot well defined, brownish.

Female.—Unknown.

This interesting species may be distinguished at a glance by the very hairy, greatly enlarged first antennal segment which is strongly suggestive of *Symphoromyia*. It is however obviously a true *Chrysopilus*.

But eight specimens are known, all from California. *Type*, Berkeley Hills, Alameda County, Apr. 11, 1908, and two paratypes, topotypical, taken by Mr. E. T. Cresson, Jr.; one topotype, March 22, 1908, (E. T. Cresson, Jr.), [A. N. S. P.]. Three specimens from Marin County, Mar. 23, 1897, (W. M. Wheeler) and one taken by J. C. Bradley at Blue Lake, Humboldt County, June 20 to 27, 1907. This latter is in the Cornell University Collection and has whitish hairs on the palpi and dense whitish hairs on fore and middle coxae.

***Chrysopilus fasciatus* Say** (Pl. III, fig. 24)

1823. *Leptis fasciata* Say, Jour. Acad. Nat. Sci. Phila., III, p. 37.

1848. *Leptis par* Walker, List. Dipt. Brit. Mus., I, p. 215.

1878. *Chrysopila fasciata* Osten Sacken, Cat. Dipt. N. A., 2nd ed., p. 63.

1908. *Chrysopilus fasciatus* Kertész, Cat. Dipt., III, p. 321.

This species often bears a close resemblance to *C. ornatus* Say from which it can be distinguished, however, by its smaller size, the more distinct stigmal spot (cell R_1 is a little wider near its distal end in *fasciatus* so that the stigmal spot is a little broader (see pl. III, fig. 24), the darkened femora, and the more distinctly infuscated knobs of the halteres. In addition to these characters, (and this is especially helpful in distinguishing the two species when the femora of *fasciatus* are rather pale) the females lack the shiny front which is always present in those of *C. ornatus*. The pleura are decidedly more distinctly light grayish pollinose in *fasciatus*.

Male.—Length, 7.5 to 8.5 mm. Velvety black; face with long whitish hairs on side; thorax covered with dense yellowish or golden tomentum; halteres yellowish with knob distinctly darkened; abdomen with a band on caudal half of each segment of silvery or golden tomentum which is sometimes narrowly interrupted in center; legs yellowish, basal two thirds of femora and tip of tarsi brownish or blackish; wings clear, stigma dark brownish, distinct. Head: Antennae, proboscis and palpi blackish, the latter with long yellowish hairs; face covered with whitish or light grayish pubescence, on sides with long whitish or yellowish hairs.

Thorax: Mesonotum and the scutellum thickly clothed with golden tomentum (frequently rubbed off on the disc of the mesonotum); pleura dark brownish or blackish covered with pale grayish pollen; halteres usually yellowish with the knob distinctly infuscated, though sometimes the stalk is also somewhat tinged with brownish.

Abdomen: Velvety black; first segment almost wholly covered with golden or somewhat silvery tomentum, remaining segments each with a band of golden tomentum occupying the caudal half and sometimes interrupted narrowly along the median line.

Legs: Coxae same as pleura, sparsely covered with long yellowish hairs. Trochanters smooth and dark brownish, remainder of legs pale yellowish (often however slightly tinged with tawny) except basal half or two-thirds of femora which is brownish or blackish, and the tip of the first tarsal segment and the remaining segments which are blackish.

Wings: Length about 7 mm.; membrane hyaline, veins dark brownish, stigma brownish, usually prominent.

Female.—Length, 8.5 to 9.5 mm. Similar to male except that front and vertex are dark brown, in certain lights light grayish satiny, the former covered with a fine pubescence which in certain lights gives it a light grayish satiny appearance.

Specimens Examined: About 119 males and females.

NEW HAMPSHIRE:⁵⁵

VERMONT:⁵⁵

MASSACHUSETTS: 1 ♀, Amherst, June 27, 1904; 1 ♂, June 23, 1904; 1 ♂, July 16, 1903; 1 ♂, June 24, 1891, [Mass. Agr. College]. 1 ♀, Notch South, Amherst, July 22, 1904, [Mass. Agr. College]. 1 ♀, Wellesley, July 11, 1909, (M. C. Van Duzee), [Leonard]; 2 ♂, Hyde Park, July 15, 1910, [A. N. S. P.].

RHODE ISLAND: 1 ♂, Kingston, [R. I. Agr. College; Lot 25, No. 64]; 1 ♂, Rhode Island?, July 4, (C. A. Davis), [R. I. College; "R. W. P." and "Davis collection"].

CONNECTICUT: 1 ♂, 1 ♀, New Haven, June 26, 1910 and June 23, 1911, (A. B. Champlain), [Conn. Agr. Exp. Sta.]; 1 ♀, June 27, 1913, (L. B. Ripley), [Conn. Agr. Exp. Sta.]; 1 ♀, June 14, 1910, (A. B. Champlain); 1 ♂, June 19, 1910, [U. S. N. M., ex Walton]; 1 ♀, Washington, [A. M. N. H., ex Slosson].

NEW YORK: Karner, July, [N. Y. S. M.]; 1 ♂, Katonah, June 1908, (Wm. Beutenmueller), [A. M. N. H.]. 1 ♀, West Nyack, July 11, 1920, (J. Bequaert), [A. M. N. H.]. 1 ♀, Van Courtland Park, July 11, 1895, (J. L. Zabriskie), [A. M.

⁵⁵ Recorded by Johnson (1925: 105) from New Hampshire and Vermont.

N. H.]. 1 ♂, Stony Point, June 27, 1910, [Davis]. 1 ♂, West Farms, (J. Angus), [A. M. N. H.]. 2 ♂, 1 ♀, Watchogue, Staten Island, July 28, 1920, (E. J. Burns), [E. J. Burns]. 2 ♀, "Staten Island" June 20 and 22, [Davis]. 1 ♂, Maspeth, Long Island, July 27, 1910, [Davis].

NEW JERSEY: 4 ♂, Riverton, June 20, 1909, [A. N. S. P., ex Harbeck]. 3 ♂, Essex County Park, July 7, 1906, (W. D. Kearfoot), [Pa. Dept. Agr.]. 4 ♂, Trenton, July 3, 1907; 1 ♂, July 4, 1907; 1 ♂, July 5, 1907; 2 ♀, July 7, 1906, [all A. N. S. P., ex Harbeck]. 1 ♂, Newfoundland, July 6, 1909, [Davis]. Hemlock Falls, June, [A. M. N. H.]. 1 ♂, Orange Mountains, June, [A. M. N. H.]. 1 ♂, Alpine, June 19, 1918, (Jos. Bequaert), [A. M. N. H.]. 1 ♂, West Englewood, July 13, 1920, (Jos. Bequaert), [A. M. N. H.]; 2 ♂, July 13, 1920, (E. J. Burns), [Burns]. 2 ♂, Fort Lee, (E. J. Burns), [Burns]. 2 ♂, Palisades, July 5, 1920; 1 ♀, July 16, 1920, (E. J. Burns), [Burns]. 1 ♀, "N. J.", [A. N. S. P.].

PENNSYLVANIA: 1 ♀, Swarthmore, July 1908; and 1 ♂, July 16, 1905; 1 ♂, July 15, 1906, (all E. T. Cresson, Jr.), [all A. N. S. P.]. 1 ♂, Philadelphia, [Leonard]. 1 ♂, Harrisburg, June 26, 1909, [Pa. Dept. Agr.]; 2 ♂, June 6 and June 23, (W. R. Walton), [U. S. N. M., ex Walton]. 1 ♂, Highspire, June 19, (W. S. Fisher), [U. S. N. M., ex Walton]. 3 ♂, Germantown, July 2 and 10, [A. N. S. P., ex Harbeck]. 1 ♂, Lehigh Gap, July 5, 1906, [A. N. S. P., ex Harbeck]. 3 ♂, Roxboro, June 27 and July 21, [A. N. S. P., ex Harbeck]. 1 ♂, 2 ♀, Perkaspie, June 18, [Pa. Dept. Agr.]. 1 ♀, Dauphin, July 4, 1909 (Pa. Dept. Agr.). 1 ♀, Progress, June 20, 1909 [Pa. Dept. Agr.]. 2 ♀, Hazleton, July 21, 1909, (W. G. Dietz), [A. N. S. P., ex Dietz]. 1 ♂, 2 ♀, Delaware Water Gap, [A. M. N. H., ex Slosson]. 1 ♂, Camp Hill, June 5, 1916, (C. S. Anderson), [Anderson]. 1 ♂, Linglestown, July 4, 1917, (C. S. Anderson), [Anderson]. 1 ♂, 1 ♀, Delaware County, July 16, 1904, (E. T. Cresson, Jr.), [A. N. S. P.]; 1 ♀, June 27, 1895, [Leonard].

MARYLAND: 1 ♀, Chesapeake Beach, July 2, 1916, (W. L. McAtee), [Biol. Surv.]. 1 ♀, Plummer's Island, June 6, 1909, (W. L. McAtee), [U. S. N. M.]. 1 ♀, "Maryland," [A. N. S. P.]. 1 ♂, Hayden, June 21, 1914, [A. N. S. P.].

VIRGINIA: 1 ♂, Dead Run, Fairfax Co., July 18, 1916, (R. C. Shannon), [U. S. N. M.]; 1 ♂, June 23, (N. Banks), [M. C. Z.]. 2 ♂, Glencarlyn, June 9, [U. S. N. M.]; 2 ♂, June 2; 2 ♂, 1 ♀, June 24, (N. Banks), [M. C. Z.]. 1 ♂, Great Falls, June 12, 1 ♂, June 21, (N. Banks), [M. C. Z.]; 2 ♂, June 8, (Wm. Mann), [Mann]; 1 ♂, June 20, 1916, (C. T. Greene), [U. S. N. M., Div. Forest Ins.]. 1 ♂, Falls Church, June 21, 1914; 1 ♀, July 4, 1913, (F. Knab), [U. S. N. M.]; 1 ♀, July 2, (N. Banks), [M. C. Z.]. 1 ♀, Chain Bridge, June 23, 1915, (C. T. Greene), [U. S. N. M., Div. Forest Ins.]. 1 ♂, Roslyn, July 6, 1913, (F. Knab), [U. S. N. M.].

NORTH CAROLINA: 1 ♂, Black Mountains, June, [A. M. N. H.]. 1 ♀, Valley of the Black Mountains, June 24 to 30, 1906, (Wm. Beutenmueller), [A. M. N. H.]. 1 ♂, 1 ♀, "N. Car." [U. S. N. M.]. 1 ♂, "N. Car." (Morrison), [U. S. N. M.].

***Chrysopilus faciatius* var. *infuscatus* new variety**

Length, ♂, 9 mm., ♀, 13 mm. Averaging a little larger, perhaps than *fasciatus* Say but as far as I can see it is otherwise practically identical with it except as follows: the veins in the fork of the radial sector and the tip of the wing apicad of a line drawn from the stigma thru the apex of the discal cell are broadly bordered with brownish so that only a small pale spot remains in the center of each of the two cells involved; the two veins arising from the apex of the discal cell may not be bordered with brownish but in any case the anal border of the wing is slightly infuscated around as far as the anal vein.

Described from 3 males and 4 females as follows:

Holotype.—A male, Greensboro, North Carolina, collected by F. C. Pratt in June, [U. S. N. M., ex Aldrich; U. S. Cat. No. 24067].

Allotype.—A female caught in coitu with the holotype and mounted on the same pin. [Also U. S. N. M., Cat. No. 24067.]

Paratypes.—2 ♀, Lafayette, Indiana, July 9, 1918, and July 3, (J. M. Aldrich), [U. S. N. M., ex Aldrich]; 1 ♂, 1 ♀, Raleigh, North Carolina, May 28, 1921 (C. S. Brimley), [N. C. Dept. Agr.]; 1 ♂, Winnfield, Louisiana, May 13, 1918, [C. W. Johnson].

***Chrysopilus flavibarbis* Adams**

1904. *Chrysopilus flavibarbis* Adams, Kans. Univ. Sci. Bul., 11, p. 438, 1904.

Velvety blackish to brownish black; pile of cheeks pale golden yellow; thorax sparsely, abdomen rather thickly clothed with golden tomentum; halteres with stem yellowish brown, knobs infuscated; femora dark brownish, tibiae brownish yellow; wings with stigma distinct; membrane with distinct brownish tinge.

Female.—Length, 5 mm. Head: Front brownish pollinose; face grayish pollinose; palpi and proboscis blackish; hairs of vertex, front, sides of face, occiput, palpi and proboscis, pale yellowish; front with a small patch of dark pile on either side near eyes and just below ocelli; antennae blackish.

Thorax: Mesonotum a velvety blackish, except a small area in front, the lateral margins including the humeri, and the posterior margin, which are grayish pollinose; a faint grayish median line extends from the front about two-thirds the distance to the scutellum; scutellum dark brownish; both mesonotum and scutellum are sparsely covered with short yellowish somewhat appressed hairs; pleura light grayish pollinose, bare; knob of halteres blackish, base yellowish brown.

Abdomen: Brownish pollinose, rather thickly clothed with short golden yellow, somewhat appressed, hairs.

Legs: Coxae light grayish pollinose, with a few rather long, golden hairs; trochanters and femora, except tip of latter, dark brownish, with a sparse covering of short golden hairs; tip of tibiae and of metatarsus and all the rest of the tarsi infuscated; legs otherwise yellowish brown.

Wings: Veins brown; stigma distinct, brownish; membrane noticeably tinged with brownish, slightly darker along veins, membrane somewhat paler in anal region.

Male.—Length, 5 mm. Mesonotum velvety black and abdomen blackish except towards tip which is brownish; otherwise like the female.

The above description was drawn up from three specimens: that of the female from a co-type marked "Colo. 1936" kindly loaned me by Mr. C. W. Johnson from his collection, that of the male from one specimen from Gallatin County, Montana, (E. S. Moore), July 20, 1901, and another from Bozeman, Montana, July 23, 1915. Both specimens appear to be somewhat rubbed, the bristles of the antennae of the female are broken off and the halteres are lacking. I have also seen: Two males, Powell County, Montana, [A. L. Melander; one retained]; one male, Bozeman, Montana, 4800 feet alt., July 1; and a male, June 25, 1900, (E. Koch), [Wash. Sta. Coll.; A. L. Melander det.]; four males, Emigration Canyon, Utah, July 21, 1917 [U. S. N. M., ex. Aldrich]. The species was described from seven specimens from Colorado and Wyoming, the Colorado specimens being in the C. W. Johnson Collection. E. S. Tucker (1907) records it from Colorado Springs in August with the note "compared with types."

***Chrysopilus foedus* Loew** (Pl. II, fig. 17)

1861. *Chrysopila foeda* Loew, Berl. Ent. Zeits., v, p. 317.

1883. *Chrysopila folda* Coquillett, Can. Ent., xv, p. 112 (misspelling).

1908. *Chrysopilus foedus* Kertész, Cat. Dipt., III, p. 321.

Blackish; mesonotum and abdomen rather thickly clothed with whitish or silvery tomentum and on the latter longer hairs; wings distinctly clouded along veins; legs brownish yellow, basal half or two-thirds of fore and middle femora usually darker.

Male.—Length, 7.5 to 9.5 mm. Head: Front and face light grayish pollinose; sides of face with long pale hairs which are moderately thick; palpi and proboscis dark brownish or blackish, the former with long, the latter with short pale hairs; antennae blackish; eyes are often separated by a space equal to about one-half the width of the ocellar tubercle, but the sides of front not parallel.

Thorax: Mesonotum blackish, occasionally somewhat lighter in front and with humeri sometimes somewhat light grayish pollinose; clothed with pale yellowish to silvery tomentum and with concolorous hairs on the sides and behind where they are longer; scutellum dark brownish or blackish with moderately long pale yellowish or silvery hairs; pleura grayish pollinose with a few pale hairs; halteres yellowish brown, knob dark brownish or blackish.

Abdomen: Blackish, clothed with silvery to yellowish tomentum which form rather distinct bands across the apical half of each segment; the dorsum is frequently badly rubbed however.

Legs: Coxae a rather light gray pollinose, with long, fairly numerous, pale hairs; trochanters fuscous; femora with appressed silvery hairs; front and middle femora, except on apical half or third, dark brownish to fuscous, hind femora somewhat brownish (occasionally wholly brownish yellow) sometimes lighter toward base; remainder of fore and middle femora, all the tibiae, and metatarsus except tip, brownish yellow; tip of metatarsus and remaining tarsal segments dark brownish or fuscous.

Wings: Veins brownish; costal cell and distal half or two-thirds of cell R_1 brownish; all the veins usually distinctly bordered with brownish.

Female.—Length, 9 to 11 mm. Similar to the male with the following exceptions: Front, vertex, and face satiny brown; front bare; vertex on either side of and just behind the ocellar tubercle often bears a large patch of rather long, dark brownish hairs, hairs on side of face darker.

Types.—1 ♂, 1 ♀ in the M. C. Z. Collection, each labelled "Type Loew" and from Illinois.

Specimens Examined: About 101 males and females.

INDIANA: 2 ♂, Lafayette, May 23, 1916; 3 ♂, May 10, 1915 and May 11, 1916; 1 ♂, May 18; 1 ♀, Shelby, May 24, 1914, (all J. M. Aldrich), [all U. S. N. M., ex. Aldrich].

ILLINOIS: 2 ♂, "N. Ill." (W. M. Wheeler), [A. M. N. H.]. 6 ♂, 1 ♀, Chicago, May 30, 1899; 1 ♀, May 20, 1899; 1 ♀, June 20, 1899; 1 ♂, 1 ♀, May 27, 1899; 4 ♂, May 28, 1899, (all W. M. Wheeler), [all A. M. N. H.]; 2 ♂, May 27, 1909, [U. of Ill.]; 1 ♂, May 30, 1898; 1 ♂, May; 1 ♀, May 24, 1897, (C. T. Brues), 14 ♂, May 30, 1899, May 30, 1898 and May 21, 1898, [all C. T. Brues]. 1 ♂, Algonquin, (Nason?), [U. S. N. M.]; 1 ♀, [U. of Ill., No. 372]; 5 ♂, 5 ♀, May and June [U. of Ill.]. 1 ♂, 3 ♀, Oak Park, June (Wescott), [Wash. State College]. 1 ♂, Plainview, May 3, 1915, [U. of Ill.]. 1 ♂, St. Joseph, Salt Fork, May 10, 1914, [U. of Ill.]. 1 ♀, Grand Tower, June 2, 1913, [U. of Ill.]. 1 ♀, Riverside, June 14, 1897, (W. M. Wheeler), [A. M. N. H.]. 2 pupa skins, (D. W. Coquillett), [U. S. N. M.].

WISCONSIN: 3 ♂, 1 ♀, (W. M. Wheeler), [A. M. N. H.]. 1 ♂, [C. T. Brues]. 1 ♀, [Wash. State College].

IOWA: 1 ♂, Iowa City, (H. F. Wickham), [U. S. N. M., ex Aldrich]. 1 ♂, Ames, (Herbert Osborn), [U. S. N. M.].

KANSAS: 3 ♂, Douglas County, 900 feet, May, (W. M. Wheeler); 1 ♂, Douglas County, 900 feet, (E. H. Snow); 1 ♀, Douglas County, 900 ft., (W. M. Wheeler), [all A. M. N. H.]; 1 ♂, 1 ♀, Douglas County, 900 feet, May, [U. of K., Lot 33]. 3 ♂, Douglas County, May, [Stanford Univ.]. 1 ♂, May 1897; 1 ♀, June 1892, (Bridwell), [U. S. N. M.]. 1 ♂, Onaga, [U. S. N. M.]; 1 ♂, May 30, 1901; 1 ♀, May 12, 1901, Onaga, [Hine].

NEBRASKA: 3 ♀, Lincoln, 1150 feet alt., May 16, 1908, [Neb. Agr. Exp. Sta.]. 4 ♂, May 9, 1908, (Neb. Agr. Exp. Sta.); 1 ♂, (W. M. Wheeler), [A. M. N. H.].

MEM. AM. ENT. SOC., 7.

SOUTH DAKOTA: 2 ♂, 1 ♀, Brookings, June 14 and 22, 1891, (J. M. Aldrich), 1 ♂, June 2, 1918, (J. M. Aldrich), [U. S. N. M., ex Aldrich].

Also:—2 ♂, 1 ♀, (Coquillett), [U. S. N. M., ex Coquillett]; 3 ♀, Nos. 5730, 5721, and 1480 (with exuvium) and 1 ♂, No. 30140, [U. of Ill.].

Habits. The following note copied several years ago from Dr. Aldrich's MS card catalog is of interest:

"Lafayette Ind., May 23, 1916.—Walked up to Headley Lake today. This species was abundant in the road, males everywhere alighting in bare places. At the lake there were numerous pairs in copula on vegetation along the shores. Evidently they are at the height of their season now."

***Chrysopilus griffithi* Johnson** (Pl. III, fig. 26)

1897. *Chrysopila griffithi* Johnson, Ent. News, VIII, p. 119.

1908. *Chrysopilus griffithi* Kertész, Cat. Dipt., III, p. 322.

Dark brownish to nearly blackish; face on lower part moderately clothed with short dark hairs; mesonotum and abdomen clothed with golden tomentum; halteres yellowish, knob blackish; legs brownish yellow, femora except tip blackish, tarsi towards tip dark brownish; wings clear, stigma brown, prominent; cross-veins and parts of adjacent longitudinal veins bordered with brownish.

Male.—Length, 4.75 to 5.00 mm. Head: Front, face, and ocellar tubercle satiny brown; palpi and proboscis dark brownish, the latter with blackish hairs; hairs below oral opening and on mouth parts pale; face bare; antennae reddish brown.

Thorax: Mesonotum blackish to dark brownish; scutellum somewhat paler than rest of thorax, brownish; both with rather dense golden tomentum; pleura dark brownish, practically bare; halteres with stalk yellowish, knob blackish.

Abdomen: Blackish to dark brownish, or brown, rather densely clothed with golden tomentum, also with sparse pale hairs which are longer on the sides and on the first segment.

Legs: Coxae brownish like pleura with rather long pale hairs especially on front pair; femora, except tip and tarsi, towards tip, blackish; remainder of legs brownish yellow.

Wings: Hyaline, costal cell slightly tinged with yellowish; stigma dark brown, elongate oval; veins brownish, certain ones bordered with dark brown as follows: The bend of fork of the anterior branch of the third vein, those forming the apex of the discal and second basal cells, and the base of the third vein to the radio-medial cross-vein and that cross-vein.

Female.—Length, 4.75 to 6 mm. General color a little lighter than in the male; front and face satiny brown; face, except upper part moderately clothed with brownish hairs, which in some lights appear pale; otherwise like the male except that the hairs on the underside of the face and proboscis appear to be darker. The golden tomentum on the thorax and abdomen is mostly rubbed off in the specimens studied.

Specimens Examined: 25; 19 males, 6 females.

VIRGINIA: 2 ♂, Boykins, June 10, 1895, [U. S. N. M., *types*]; 1 ♀, [M. D. Leonard, *allotype*]; several other specimens, *paratypes*.

NORTH CAROLINA: 1 ♂, Raleigh, (C. L. Metcalf), early August, [N. Car. Dept. Agr.]; Hertford County, June 9, 1895, *paratypes*.

SOUTH CAROLINA: 1 ♀, Summerville, June 27, 1906, (E. T. Cresson, Jr.), [A. N. S. P.].

GEORGIA: 1 ♂, Tifton, Oct. 16, 1896, [U. S. N. M., ex Aldrich]. 5 ♂, 1 ♀, "S. Ga." (Morrison), [U. S. N. M.]. 1 ♀, labelled "Georgia, C. U. Lot 35" and "Cornell Lot 60," [C. U.].

FLORIDA: 1 ♀, Sanford, April 1908, (M. C. Van Duzee), [Leonard, ex Van Duzee]. 1 ♂, Punta Gorda, Nov. 11, 1911, (Wm. T. Davis), [A. M. N. H.]; 1 ♂, Nov. 13, 1911, [Davis]. 3 ♂, 1 ♀, Jacksonville, (A. T. Slosson), [A. M. N. H.].

A paratype, female, which I have from C. W. Johnson, Boykins, Virginia, July 10, 1895 measures 4.75 mm. and a female from M. C. Van Duzee, Sanford, Florida, Apr. 1908, measures 6 mm. Two other specimens from Georgia, and Punta Gorda, Florida, are intermediate in size. This species may readily be distinguished by the markings on the wing veins.

***Chrysopilus humilis* Loew**

1874. *Chrysopila humilis* Loew, Berl. Ent. Zeits., XVIII, p. 379.

1908. *Chrysopilus humilis* Kertész, Cat. Dipt., III, p. 332.

Length, ♂, 4.5 to 5.5 mm. Opaque black, the pile of the palpi blackish or as in type dirty whitish, that of frontal tubercle black, of rest of body dirty whitish; tibiae and base of tarsi usually brownish yellow; wings strongly tinged with grayish brown, stigma dark brown.

I believe that the above brief description sufficiently diagnoses the species without going into further detail. I have seen a number of specimens of northwestern *Chrysopili* which may or may not be *humilis*. I am, however, not yet prepared to decide upon the specific variations within the species and therefore until some later time prefer not to try to place them definitely. I suspect, however, that the species is fairly wide spread and locally fairly common in the Northwestern States.

Type.—What is undoubtedly the type of *humilis* Loew was found by Mr. Nathan Banks, during one of my visits to the Museum of Comparative Zoology, in the collection of miscellaneous Therevidae, and it was transferred by him to the proper place. It is a male and labelled "humilis Lw." "S. Fransisco. H. Edw."

"Loew". It agrees well with Loew's description⁵⁶ but unfortunately the last joint of the antennae is gone and all the legs except the coxae and the front left femur. The left wing is also gone.

Six males comprise the rest of the series in the Museum of Comparative Zoology, and are those referred by Osten Sacken (1877: 224) as the males taken at Los Angeles not identifiable with *humilis*.

In addition to the type male from San Francisco, California, I place here at present the following: 2 ♂, Beulah, New Mexico, June, 29, 1902 [A. N. S. P.] and 1 ♂, "N. Ill." [A. N. S. P.]. It is also recorded from Colorado Springs, Colorado, in August by E. S. Tucker (1907).

***Chrysopilus lucifer* Adams**

1904. *Chrysopila lucifera* Adams, Kans. Univ. Sci. Bul., II, p. 437.

1908. *Chrysopilus lucifer* Kertész, Cat. Dip., III, p. 323.

I do not know this species and hesitate to refer any material I have seen to it. A translation of the original description follows:

"Male: Head black; frontal triangle, face and cheeks gray pollinose; antennae and palpi black, the latter long, subclavate, thickly black pilose; proboscis with brownish cast; pile of cheeks black. Thorax black, pollen dark gray on mesonotum, light on pleurae; mesonotum with golden yellow tomentum, sparse pile dark brown; scutellum black, golden yellow tomentose; halteres black. Abdomen black, tomentum of dorsum golden yellow; pile white. Coxae black, with black pile; femora blackish, tibiae and base of tarsi yellow. Wings subfuscous; stigma slightly elongate, bend of anterior branch of third vein rectangular, sometimes furnished with a stump.

"Female: Same as male except pile of cheeks and coxae is white, palpi shorter and not so thickly pilose; front brownish gray pollinose, pile black, tomentum golden yellow. Femora somewhat lighter, and extreme tip of tibiae fuscous. Length, 6-7 mm.

"Three males from Washington and one female from California."

***Chrysopilus modestus* Loew (Pl. III, fig. 23)**

1872. *Chrysopila modesta* Loew, Berl. Ent. Zeits., XVI, p. 58.

1908. *Chrysopilus modestus* Kertész, Cat. Dipt., III, p. 323.

Male.—Length, 4.5 to 6.5 mm. Head: Face gray pollinose, bare; palpi gray, proboscis pale yellow, both the latter with long pale hairs; antennae yellowish or somewhat brownish.

Thorax: Mesonotum often grayish with two rather ill defined paler stripes gradually becoming more obscure towards wing base; more or less densely clothed with

⁵⁶ Translated by Osten Sacken (1877: 223).

short yellowish or golden tomentum which is often mostly rubbed off; scutellum grayish or fuscous and also clothed with yellowish or golden tomentum; pleura blackish in ground color, grayish pollinose; halteres pale yellowish, knobs brownish or fuscous.

Abdomen: Dark brownish or fuscous; first segment wholly, the basal half of the second and the caudal border of the remaining segments yellowish; hypopigium fuscous; dorsum in the better preserved specimens, clothed with short, golden tomentum, laterally with a few long erect pale hairs.

Legs: Coxae grayish or fuscous, with a few rather long pale hairs; femora pale yellowish, apical part of hind pair brownish; tibiae yellowish, tarsi toward tip fuscous, remainder more or less yellowish.

Wings: Entire membrane very slightly infuscated but often more noticeably so toward apex; stigma dark brownish, distinct, oval in outline; veins dark brownish.

Female.—Length, 5 to 6.5 mm. Like the male except in the following particulars: front and face of a satiny brownish, with grayish pollen which is usually rubbed off on the front so that the front often appears to be somewhat spotted or patched with blackish; posterior margin of abdominal segments in specimens before me more of a brownish yellow than in the male and the whole abdomen brownish in color rather than fuscous; first segment only paler in color.

Types.—1 male, 1 female; "type. Loew. Texas Sept.", [Museum of Comparative Zoology Collection].

Specimens Examined: About 138 males and females.

NEW YORK: 1 ♂, Goat Island, Niagara Falls, August, 1874, (Osten Sacken), [M. C. Z.]. 1 ♀, Buffalo, August 20, 1910; 1 ♂, July 24, 1910, (M. C. Van Duzee), [Leonard]. 2 ♂, 3 ♀, Middleport, July 1, 1923, (M. C. Van Duzee), [Van Duzee].

MARYLAND: 2 ♀, Plummer's Island, June 30, 1912, (W. L. McAtee), [Biol. Surv.]; 1 ♀, July 12, 1914, (L. O. Jackson), [Biol. Surv.]; 4 ♂, June 29, 1913; 1 ♂, July 20, 1913, (R. C. Shannon), [U. S. N. M.]. 1 ♂, Linnievile, July 7, 1913, (R. C. Shannon), [U. S. N. M.].

DISTRICT OF COLUMBIA: 1 ♀, Little Falls, August 22, 1915, (W. L. McAtee), [Biol. Surv.]. 2 ♂, Washington, July 1 and 14, (Caudell), [U. S. N. M.]; 1 ♂, June 20, [N. Y. S. M.].

VIRGINIA: 1 ♀, Great Falls, July 20, 1913, (F. Knab), [Shannon]; 1 ♂, June 25, 1915; 1 ♂, June 28, 1917, (C. T. Greene), [U. S. N. M.; Div. Forest Ins.]; 1 ♀, June 27, [N. Y. S. M.]. 1 ♀, Chain Bridge, June 23, 1915, (C. T. Greene), [U. S. N. M.; Div. Forest Ins.]. 6 ♂, Rosslyn, June 6, 1913, (F. Knab), [U. S. N. M.]. 1 ♂, June 27, 1880, [Kansas].

OHIO: 2 ♂, Vinton, June 5 to 12, 1900, [Hine].

INDIANA: 4 ♂, Lafayette, July 12, 1918, (J. M. Aldrich), [U. S. N. M.].⁵⁷

ILLINOIS: 1 ♂, Lake Forest, August 10, 1906, (J. G. Needham), [Leonard]. 3 ♂, Champaign County, (W. A. Snow), [Kansas]; 1 ♂, (W. A. Snow), [Banks]; 1 ♂, August 2, 1926; 1 ♀, July 12, 1926, (V. G. Smith), [Can. Dept. Agr.]. 2 ♂, 1 ♀, Urbana, July 18, 1917, (on cottonwood); 2 ♂, White Heath, June 29, 1917; 1 ♂,

⁵⁷ Recorded from Elkhart by Johnson (1897: 120).

Monticello, June 28, 1914; 1 ♂, Pulaski, June 28, 1909; 2 ♂, Mount Carmel, July 2, and June 30, 1906, [all U. of Ill.].

MICHIGAN: 1 ♀, undoubtedly from Michigan, [Conn. Agr. College, ex "Ag. Col. Mich., No. 353."].

WISCONSIN: 2 ♂, 2 ♀, [A. M. N. H.].

MISSOURI: 1 ♀, Kansas City, [U. S. N. M.].

LOUISIANA: 1 ♂, Opelousas, April 1897, [Leonard, ex Johnson]; 2 ♂, April, 1897, [Brook. Mus.]; 4 ♂, 3 ♀, April 1897, [U. S. N. M., ex Aldrich].

TEXAS: 1 ♂, (Belfrage), [U. S. N. M.]. 5 ♂, July 12, 1919; 2 ♂, July 6, 1919; 1 ♀, May 22, 1917, all College Station, (H. J. Reinhard), [Tex. Agr. College].

KANSAS: 3 ♂, Douglas County, June, [Univ. of Kans.]; 3 ♂, [Banks]. 1 ♂, 1 ♀, July, (J. C. Bridwell), [U. S. N. M.].⁵⁸ 1 ♂, Onaga, (Crevecoeur), [U. S. N. M.]. 5 ♂, Lawrence, [U. S. N. M., ex Aldrich]; 1 ♂, Lawrence, June 1903, [Kansas]. 1 ♂, Twilight, Lawrence County, July, (E. S. Tucker), [Stanford Univ.]. 4 ♂, 2 ♀, Riley County, July 2 and 13, (Popenoe), [Kans. Agr. College].

NEBRASKA: 20 ♂, Lincoln, July 21, 1909. (C. H. Gable); [Neb. Exp. Sta.]; 1 ♂, July 11, 1916, [Leonard]; 1 ♂, June 28, 1916; 1 ♂, July 7, 1916, (O. C. Bradbury), [Bradbury]. 3 ♀, [A. M. N. H.]. 1 ♂, [U. S. N. M.].

There are specimens in the United States National Museum and Nathan Banks collections from Washington, Texas, Nebraska, Kansas, etc., determined respectively by Coquillett and Banks as *apicalis* Wulp. I make them all *modestus*. I cannot fit them in very well with Wulp's description of his *apicalis*. It may be that his species is a synonym of *modestus*.

Chrysopilus nudus Cresson

1919. *Chrysopilus nudus* Cresson, Proc. Acad. Nat. Sci. Phila., 1919, p. 176.

I have had an opportunity to study a male and a female paratype in the Academy of Natural Science of Philadelphia collection but do not believe that I can improve upon Mr. Cresson's original description a copy of which therefore follows:

"This species suggests *flavibarbis* Adams, but the mesonotum of the female is not velvety and the pile and tomentum are not yellow.

"♂. Black; stalk of halteres, tibiae and bases of tarsi, pale. Wings slightly brownish, opaque grayish. Mesonotal dorsum, broad bases of abdominal segments, brownish. All pile and tomentum sparse and white. Antennae bare. Eyes narrowly separated. First antennal joint shorter than second. Palpi long, falciform, white pilose. Branch of third vein originating opposite end of first vein. Length, 5 mm.

"♀. Similar, but stouter. Frons broad and brownish medianly. Mesonotum with a broad median stripe and two large sublateral spots, brown. Hind femora

⁵⁸ Recorded also from Douglas County, June and July, by Snow (1903: 212); July and August, by Tucker (1907: 89).

sometimes pale. Branch of third vein originating before tip of first; anal cell closed before margin.

"Type.—♂; San Jacinto, California, May 29, 1917, (E. P. Van Duzee), [Cal. Acad. Sci.]. *Paratypes*.—1 ♂, 2 ♀; topotypical."

***Chrysopilus ornatus* Say** (Pl. III. fig. 32)

1823. *Leptis ornata* Say, Jour. Acad. Nat. Sci. Phila., III, p. 34.

1835. *Leptis serveilli* Guerin, Inconogr. d. Regne Anim., VIII, p. 541.

1874. *Chrysopila servilli* Osten Sacken, Bull. Buffalo Soc. Nat. Sci. II, p. 172.

1902. *Chrysopila ornata* Hine, Ohio Nat., II, p. 170.

1908. *Chrysopilus ornatus* Kertész, Cat. Dipt., III, p. 325.

Male.—Length, 11 to 13 mm. Velvety black. Head: Antennae, proboscis and palpi, blackish, the latter covered with long dark hairs; face blackish covered with light grayish pubescence, and on the sides with long yellowish hairs.

Thorax: Mesonotum and scutellum velvety black, covered with dense golden tomentum; pleura dark brownish, occasionally in some lights slightly light grayish pollinose; halteres yellowish, knob slightly infuscated.

Abdomen: Velvety black, first segment covered almost wholly with golden tomentum, each of remaining segments with a band, usually interrupted along the median line of golden or silvery tomentum which occupies the caudal half of the segment.

Legs: Coxae, same as pleura, with long yellowish or silvery hairs; trochanters blackish; remainder of legs pale yellowish except apex of metatarsus and the remaining segments which are dark brownish or blackish.

Wings: Membrane hyaline, sometimes tinged with yellowish, especially along costal border; veins dark brownish; stigma fairly distinct, yellowish brown.

Female.—Length, 14–17 mm. Similar to male except that vertex is dull blackish, in certain lights pale grayish satiny; front black and shining.

This species is near *C. fasciatus* Say from which it may be distinguished by the characters mentioned under that species.

Specimens Examined: About 400 males and females.

ONTARIO: 1 ♂, Toronto, April 27, 1893, [U. S. N. M.]. 1 ♂, Jordan, June 16, 1915, (W. A. Ross); several specimens of both sexes, June and July, (W. A. Ross); 1 ♀, "W. Ontario"; 2 ♂, Ontario?; 1 ♂, Niagara Glen, June 23, 1926, (G. S. Walley); 1, Mt. Pelee, July 8, 1927, (F. P. Ide); 1 ♀, Normandale, June 29, 1925, (G. S. Walley); 1 ♀, Strathroy, June 26, 1925, (H. F. Hudson), [all C. N. M.]. 1 ♀, Niagara Glen, July 1, 1908, (W. G. Dietz), [A. N. S. P., ex Dietz]. 1 ♂, Guelph, August 6, 1912; 1 ♂, Simcoe, June 23 to 30, 1915; 1 ♂, Grimsby, June 18, 1912; 1 ♂, July 1912; 1 ♀, June 17, 1912, [all Ont. Agr. College].

VERMONT: 3 ♂, Middlebury, July 1912, [R. I. Agr. College].

MASSACHUSETTS: 1 ♀, (Geo. Dimmock), [U. S. N. M., ex Riley]. 1 ♂, 2 ♀, Mount Tom, June 26, 1900, [U. S. N. M.].

CONNECTICUT: 1 ♀, Darien, July 11, 1912, [Leonard, ex Johnson]. 1 ♂, Branford, June 8, 1918, (B. H. Walden), [Conn. Agr. Exp. Sta.]. 1 ♂, New Haven, June

7, 1909, (B. H. Walden); 1 ♀, June 17, 1919, (K. F. Chamberlain), [Conn. Agr. Exp. Sta.]; 1 ♂, June 4, 1911; 1 ♀, June 14, 1910, (A. B. Champlain), [U. S. N. M., ex Walton]. 1 ♀, "Conn." [A. M. N. H., ex Slosson]; 1, "Conn.," (S. W. Williston), [Kansas].

NEW YORK: 1, Sacandaga Park, Fulton County, June 29, 1916, (C. P. Alexander), [Cornell]. 2 ♂, Honeoye Falls, June 22, 1913, (M. D. Leonard), [Leonard]. 1 ♀, Appleton, July 11, 1926, (H. Dietrich), [Dietrich]. 1 ♂, 1 ♀, Genesee County, June 18, 1916, [Davis]. 1 ♂, Batavia, July 25, 1916; 1 ♀, July 1, 1916; 1 ♀, July 15, 1913; 1 ♀, June 26, 1913, (H. H. Knight), [Leonard]. 1 ♂, Niagara Falls, June 9, 1912; 1 ♂, June 13, 1909, (M. C. Van Duzee), [Leonard]; 1 ♀, June 1925, [Colo. Agr. College, ex Chas. R. Jones]; 1 ♀, June 25, [C. U.]; 1 ♂, 1 ♀, June 24, (Jos. Bequaert), [A. M. N. H.]. 1 ♀, Boston, June 10, 1911, (M. C. Van Duzee), [Leonard]. 1 ♀, Conesus Lake, June 23, 1916, (Wm. T. Davis), [Davis]. 1 ♂, Ithaca, June 16, 1914; 2 ♀, June 14, 1914; 1 ♀, June 22, 1914; 1 ♂, June 20, 1895; 1 ♂, June 30, 1891; 1 ♀, June 27, 1890; 1 ♀, June 22, 1890; 1 ♀, July 1, 1897; 1 ♂, June 30, 1885, (G. F. Atkinson); 2 ♂, June 22, 1916; 1 ♀, June 28, 1887, (S. H. Crossman); 1 ♂, June 29, 1885, (J. M. Steadman); 1 ♂, June 30, 1886, (A. L. Benham); 1 ♀, June 17, 1916; 1 ♂, June 27, 1915; 1 ♂, 1 ♀, June 24, 1916; 1 ♀, June 14, 1915; 1 ♂, June 17, 1916; 1 ♂, June 18, 1915; 1 ♀, June 14, 1922, (H. C. Hallock); [all C. U.]; 1 ♂, 1 ♀, June 20, 1920, (M. D. Leonard); 3 ♂, June 19, 1920, (H. C. Hockett); 1 ♂, June 29, 1912, [all Leonard]; 3 specimens, July 24, 1917, (E. C. Van Dyke), [Cal. Acad. Sci.]. 1 ♂, Caroline to Harford, June 15, 1904; 1 ♂, McLean, July 2 to 3, 1904; 1 ♂, July 3, 1920, [Leonard]. 1 ♀, Freeville, July 4, 1904, [C. U.]; 2 ♂, Taughannock, July 4, 1920, (M. D. Leonard), [Leonard]. 1, Albany, July (N. Y. S. M.); 1, New Salem Swamp, Albany Co., July, (S. C. Bishop), [N. Y. S. M.]. 1 ♂, 1 ♀, Helderberg Mountains, Albany County, July 18, 1908, [Davis]. Bethlehem, June, (A. J. Lintner), [N. Y. S. M.]. 1 ♀, Stony Clove, July 1910, [A. M. N. H.]. 1, Poughkeepsie, June, [N. Y. S. M.]. 1 ♂, 1 ♀, West Point, [Brook. Mus.]; 1 ♂, 1 ♀, June 9, 1911, [Davis]. 2 ♀, Katonah, June, 1908, (Wm. Beutenmueller), [A. M. N. H.]. 1 ♂, (F. Watson), [Staten Id. Mus.]; 1 ♀, [A. M. N. H.]. 1 ♂, 1 ♀, Ramapo, June 12, [Davis]. 2 ♀, June, [Brook. Mus.]. 1 ♂, 2 ♀, Nyack, June 11, [Davis]. 1 ♂, Richmond, Staten Island, June 8, 1915, [Davis]. 1 ♂, Staten Island, [A. M. N. H.]. 1 ♀, Richmond Hill, July 2, 1901, [Pa. Dept. Agr.]. 1 ♂, Flatbush, Long Island, June 20, 1910, (G. P. Englehardt), [Brook. Mus.]. 1 ♀, Jamaica, Long Island, [Brook. Mus.]. 1 ♂, 1 ♀, Sea Cliff, June, [Banks].

NEW JERSEY: 2 ♂, Alpine, [A. M. N. H.]. 1 ♂, 1 ♀, Brookside, July, [A. M. N. H.]. 1 ♀, Passaic Junction, July, [A. M. N. H.]. 1 ♂, Newark, June 27, 1892, [Brook. Mus.]. 1 ♂, Essex Falls, June 5, 1910, (A. Nicolay), [Brook. Mus.]. 1, Bear Swamp, Ramapo Mountains; 1 ♀, June 20, 1910, (C. L. Pollard), [Staten Id. Mus.]. 1 ♂, 1 ♀, Hemlock Falls, May, June; 1 ♀, Forest Hill, August; 1 ♂, 3 ♀, Ramsey; June 13, 19, 1916, (Jos. Bequaert); 1 ♀, New Brunswick, June 7; 1 ♀, Snake Hill, [A. M. N. H.]. 1 ♂, 1 ♀, Dover, June 23, 1892, [U. of Ill.].

PENNSYLVANIA: 1 ♀, North East, June 6, 1916, (Cushman), [U. S. N. M., Div. Forest Ins.]. 2 ♂, 2 ♀, Swarthmore, June 18, 1905, June 10, 1906, June 18, 1906, (E. T. Cresson, Jr.), [A. N. S. P.]. 1 ♀, Johnson, May 31, 1900, [U. S. N. M.].

4 ♂, 1 ♀, Delaware Water Gap, June 20, [A. M. N. H., ex Slosson]. 2 ♀, Janette, [U. S. N. M., ex Aldrich]. 1 ♂, 2 ♀, Allegheny June 14, 1891, [U. S. N. M., ex Aldrich]. 1 ♂, Castle Rock, Delaware Co., June 22, 1902; 1 ♀, June 30, 1907; 1 ♀, June 10, 1905; 1 ♂, June 22, 1902; 1 ♀, June 30, 1907; 1 ♀, June 10, 1905; 1 ♂, June 30, 1907, (all E. Daecke); 1 ♀, June 16, 1904, [all Pa. Dept. Agr.]; 1 ♀, June 30, (Henry Skinner); 1 ♂, June 3, 1906; 1 ♂, July 14, 1908; [A. N. S. P.]. Stoverdale, June 23, 1915, (E. Daecke); 1 ♀, Lotell; 1 ♂, Inglenook, June 26, 1910; 1 ♀, June 21, 1910, (H. B. Kirk); Hummelstown, June 6, 1912, (J. N. Knull); 1 ♀, June 7, 1912; 1 ♀, Perdix, June 8, 1913; 1 ♀, July 1, 1917; 1 ♀, June 29, 1917, (J. N. Knull), [all Pa. Dept. Agr.]. 2 ♂, 4 ♀, Germantown, June 18, 1905, [F. Haimbach], [A. N. S. P., ex Haimbach]. 1 ♂, 1 ♀, Lehigh Gap, July 2 and 12, 1906; 1 ♂, Glenside, June 13, 1907, [A. N. S. P.]. 5 ♂, 5 ♀, Roxboro, May 31 to June 27, (F. Haimbach), [A. N. S. P., ex Haimbach]. 1 ♂, Perkasio, Montgomery County, June 18, (F. Haimbach), [A. N. S. P., ex Haimbach]. Philadelphia, 1 ♀, June 22, 1891, [Colorado Agr. College; rec'd from Chas. R. Jones]; 4 ♂, 5 ♀, [Cornell]; 1 ♂, 1 ♀, July 11, 1891, [M. D. Leonard]; 1 ♂ [A. L. Melander], 1 ♀, June 2, [Stanford Univ.]. 2 ♀, Highspire, July 6, 1907, (W. S. Fisher); 4 ♂, 4 ♀, Harrisburg, June 14 to July 4, (W. R. Walton); 1 ♀, Pequea, June 21, 1909, [all U. S. N. M., ex Walton]. 1 ♂, 1 ♀, Linglestown, May 30, 1919, [C. S. Anderson]. 1 ♀, Willowdale, July 5, 1917, (J. Primm), [Pa. Dept. Agr.]. 1 ♀, N. Cumberland, June 19, 1910, (H. B. Kirk), [Pa. Dept. Agr.]. 1 ♂, Montgomery County; 1 ♀, June 20, 1911, [Davis]. 1 ♂, 1 ♀, "Pa." [A. M. N. H., ex Wheeler].

MARYLAND: 1 ♀, Plummer's Island, June 14, 1915; 2 ♀, June 23, 1907; 1 ♀, July 7, 1907; 2 ♀, July 4, 1907; 1 ♂, July 7, 1907; 1 ♂, July 14, 1907; 3 ♀, June 30, 1907; 1 ♀, June 7, 1908; 4 ♂, June 23, 1907, (all A. K. Fisher); 2 ♀, June 10, 1906; 1 ♀, June 2, 1912; 1 ♀, June 23, 1907; 1 ♀, June 17, 1913; 1 ♂, June 2, 1916, (all W. L. McAtee); 1 ♀, June 8, 1913, (A. Wetmore), [all Biol. Surv.]; 1 ♂, 1 ♀, June 20, 1908; 1 ♂, June 22, 1909, (W. L. McAtee), [U. S. N. M., ex Walton]; 1 ♂, June 6, 1914, (R. C. Shannon), [U. S. N. M.]. 1 ♂, Beltsville, June 1, 1916, (R. C. Shannon), [U. S. N. M.]. 1 ♂, Cabin John Run, June 10, 1910, [Davis] and 1 ♂, July 2, 1916, (R. M. Fouts), [U. S. N. M., ex Walton].

DISTRICT OF COLUMBIA: Washington, 1 ♂, June 1898, (F. C. Pratt), [U. S. N. M.].

VIRGINIA: 2 ♂, Dixie Landing, June 25, (C. H. T. Townsend), [U. S. N. M., ex Aldrich]; 1 ♂, May 30, [U. of Minn.]; 2 ♀, May 30, [Kansas]. 1 ♂, Blacksburg, May to June, 1916, [Leonard, ex Va. State Crop Pest Comm.]. 1 ♂, Falls Church, July 4, 1913, (F. Knab), [U. S. N. M.]; 1 ♂, June 25, 1917, (C. T. Greene), [U. S. N. M., Div. Forest Ins.]. 1 ♂, East Falls Church, May, (S. A. Rohwer), [U. S. N. M.]. 1 ♀, Great Falls, June 19, 1910, [Davis]. 3 ♂, 3 ♀, Langley, July 1903, (Wm. Palmer), [U. S. N. M.]. 1 ♂, Dead Run, Fairfax Co., June 9, 1915, (R. C. Shannon), [U. S. N. M.]. 2 ♀, Chain Bridge, June 26, 1917, (C. T. Greene), [U. S. N. M., Div. of Forest Ins.]; 1 ♀, May 6, 1905, (D. H. Clemons), [U. S. N. M.]. 1 ♂, 1 ♀, Bluemont, June 13, 1916, (J. N. Knull) and June 13, 1916, [U. S. N. M., Div. Forest Ins.]. 1 ♂, 1 ♀, near Plummer's Island, June 11, 1916, (H. L. Viereck), [Biol. Surv.]. 1 ♂, Glencarlyn, June 9, (S. A. Rohwer), [U. S. N. M.].

OHIO: 2 ♂, 1 ♀, "Ohio" June 24, 29, 1907 and July 4, 1907, [Ohio Agr. Exp. Sta.]. 2 ♂, Wooster, June 28, 1907, [Ohio Agr. Exp. Sta.]; 2 ♂, June 9 to 15, 1920, (Q. Lowry), [N. H. Agr. College]. 1 ♂, Columbus, June 7, 1920, (Q. Lowry), [N. H. Agr. College]. 1 ♀, Cincinnati, June 9 to 16, 1901, [Hine]. 1 ♂, Vinton, June 5 to 12, 1900, [Hine].

NORTH CAROLINA: 1 ♂, Raleigh, May 26, 1921, (C. S. Brimley), [N. Car. Dept. Agr.]. 1 ♂, 1 ♀, Black Mountains, June and 1 ♂, June 20, [A. M. N. H.]. 1 ♀, [Brook. Mus.]. 1 ♀, Valley of the Black Mountains, June 23, 1906, (Wm. Beutenmueller, [A. M. N. H.]. 2 ♂, 2 ♀, Linville Falls, 4000 feet alt., late June 1920; 2 ♂, mid June, 1920, (F. Sherman), [N. Car. Dept. Agr.]. 1 ♂, Haywood Co., June 22, 1920, [Davis]. 1 specimen, June 1910, (F. Sherman), [N. Car. Dept. Agr.; Hine det.]. 2 ♂, Lake Toxaway, [A. M. N. H., ex Slosson].

FLORIDA: 1 ♂, Hot Springs, [A. M. N. H., ex Slosson].

INDIANA: 2 ♂, 3 ♀, Lafayette, June 2, 6, 19, (J. M. Aldrich), [U. S. N. M., ex Aldrich].

ILLINOIS: 2 ♂, 1 ♀, Chicago, June 12, 1898; 10 ♂, 3 ♀, June, [C. T. Brues]; 1 ♀, June 21, 1899, [A. M. N. H., ex Wheeler]. 1 ♂, "N. Ill." [A. N. S. P.]; 2 ♂, 1 ♀, [A. M. N. H.]. 1 ♀, Urbana, June 18, 1906; 2 ♂, Freeport, July 4, 1917; 4 ♂, 4 ♀, Algonquin, (Wm. A. Nason); 8 ♂, June 4 to 14, 1895; 3 ♂, 2 ♀, Augerville, June 6, 1915; 1 ♂, Oregon, June 19, 1917, [all U. of Ill.].

MICHIGAN: 2 ♂, East Lansing, June 18, 1916; 2 ♂, 1 ♀, June 13, 1916; 1 ♀, June 25, 1890; 1 ♀, June 16, 1895; 1 ♀, June 19, 1890; 1 ♂, June 28, 1897, [Mich. Agr. College].

WISCONSIN: 1 ♀, Polk County, July, (C. F. Baker), [Stanford Univ.]. 1 ♂, Milwaukee, June 24, 1899; 1 ♀, June 28, 1895, [A. M. N. H., ex Wheeler]; 1 ♀, June 23, 1895, [A. M. N. H.]; 6 ♂, June 24, 1899, [A. M. N. H.]. 6 ♂, 4 ♀, Beaver Dam, June 28 and 29, (W. E. Snyder); 2 ♂, July 1, 1909, [A. N. S. P., ex Dietz]. 3 ♀, "Wis." [A. M. N. H., ex Wheeler]. 4 ♀, (1 from Wisconsin, June) and 1 ♂, Wisconsin, June, (Westcott), [Wash. State College].

MINNESOTA: 1 ♂, Olmstead County, July 4; 2 ♀, (C. N. Ainslee); 2 ♂, 1 in June, [U. of Minn.].

MISSOURI: 1 ♂, Columbia, May 26 to June 8, 1906, (C. R. Crosby), [Cornell].

KANSAS: 1 ♂, Onaga, (Crevecoeur), [U. S. N. M.]. 1 ♀, Douglas County, 900 feet, alt., [Kansas].

Biology.—The larva and pupa was briefly described by Hine (1902) from a specimen found under rotten wood on May 1, the adult emerging June 18.

***Chrysopilus pilosus* new species**

Blackish; mesonotum and abdomen with rather dense, long, appressed, silvery white hairs; face and palpi also with similar erect hairs; knob of halteres infuscated; femora blackish, tibiae yellowish; wings often distinctly tinged with brownish.

Male.—Length, 5 to 6 mm. Head: Face light gray pollinose, with long rather dense pale hairs on sides and on cheeks; palpi and proboscis dark brownish or blackish, the former with long pale hairs but sometimes with a few black ones towards tip; antennae blackish, somewhat grayish pollinose, the first segment noticeably larger than the other two and with rather dense long blackish hairs on all sides; ocellar triangle with similar hairs and a row on either side of ocellar triangle just behind eyes.

Thorax: Mesonotum grayish to blackish in ground color, in the better preserved specimens with rather dense, rather long mostly appressed, silvery white hairs and with a small tuft of erect black hairs just behind humeri and usually with a few similar ones on front part of the disc; on rubbed specimens the mesonotum sometimes has a trivittate appearance in front; scutellum concolorous with mesonotum, and the hairs pale, less dense, longer and more erect; pleura dark brownish to blackish in ground color, more or less gray pollinose, for the most part bare except for a tuft of long pale hairs just behind humeri and another on metapleura in front of the halteres; halteres infuscated, extreme base of stalk yellowish.

Abdomen: Blackish in ground color; in the better preserved specimens thickly clothed with rather long, appressed, silvery white hairs which are less abundant at base of each segment; on the extreme lateral border and on the venter these are somewhat longer and more erect.

Legs: Coxae blackish in ground color, grayish pollinose and with rather numerous, long, pale hairs; trochanters fuscous, femora dark brownish to blackish with sparse, appressed, silvery hairs and on the hind pair particularly with a few black ones on under sides; extreme tip of femora usually, the tibiae wholly, and base of tarsi brownish yellow; apical three segments of tarsi brownish.

Wings: Membrane more or less strongly tinged with brownish; veins rather heavy and dark brown; stigma brownish, not very distinctly marked.

Female.—Length, 7 to 8 mm. Similar to male except as follows: front brownish, (somewhat gray pollinose just above antennae) and with short, fairly numerous coarse, black hairs which are longer on vertex either side of ocellar tubercle; hairs on sides of face not quite so long; palpi with more numerous black hairs.

Described from 34 specimens; 30 ♂, 4 ♀ as follows:

Holotype.—Male, Muncie, Illinois, May 20, 1909 [University of Illinois Colln.].

Allotype.—Female, Muncie, Illinois, June 3, 1917 [University of Illinois Colln.].

Paratypes.—29 males and 3 females as follows: MICHIGAN: 3 ♂, Battle Creek, [U. S. N. M., ex Aldrich]. OHIO: 2 ♂, Wooster, June, 7, 1907; 2 ♂, June 19, 1907, [Ohio Agr. Exp. Sta.]. 1 ♂, Columbus, May 11, 1899, [Hine]. 1 ♂, Fort Ancient, June 10 to 12, 1902, [Hine]. INDIANA: 1 ♂, Lafayette, May 14, 1918; 1 ♂, May 11, 1912 (swept from grass); 1 ♂, May 18, 1916; 1 ♂, June

5, 1915, [U. S. N. M., ex Aldrich]. ILLINOIS: 1 ♀, Muncie, June 3, 1917, [U. of Ill.]. 5 ♂, 2 ♀, Algonquin, (Nason), [U. of Ill.; several det. by Coquillett as *C. propinqua* and *simillima*]; 4 ♂, [U. S. N. M., ex Aldrich]. 1 ♂, Dongola, May 10, 1916, [U. of Ill.]. 1 ♂, Murphysboro, May 10, 1916, [U. of Ill.]. 1 ♂, Carbondale, May 15, 1910, [U. of Ill.]. 1 ♂, Chicago, May 30, 1899, [A. M. N. H.]. 1 ♂, "N. Ill." [A. N. S. P.]. NEBRASKA: 1 ♂, Lincoln, June 3, 1916, (O. C. Bradbury), [Leonard]. COLORADO: 1 ♂, "Colorado," July, (B. S. Kimball), [Kansas].

This species is apparently as closely related to *proximus* Walker as to any; in fact two specimens of *pilosus* in the University of Illinois collection had been determined by Coquillett as *proximus*. It may be in general distinguished from *proximus* by its somewhat more robust appearance which is largely due to the somewhat shorter stouter, abdomen; by the abundant pale hairs on the mesonotum, abdomen and face; and by the somewhat shorter, slightly more rounded wings, the membrane of which is much more distinctly tinged with brownish, and by the stouter darker veins.

There is some variation in the specimens from which *pilosus* has been described; this is partly due to some of them being rubbed. Those from Wooster, Ohio, lack the mesonotal and abdominal hairs almost entirely; in several of the paratypes from Illinois the hairs on the side of the face are quite short and those on the first antennal segment and behind and above the eyes appear quite pale in most lights. In several other specimens the wing membrane is but very faintly tinged with brownish and the stigma is very pale. The Colorado specimen has the antennae broken off except the first segment which does not seem so large as in the others and the palpi are more slender but I leave it here provisionally. I have no doubt, however, that these all belong to the same species and believe that *pilosus* is a valid one.

I believe that I have been correct in the association of the females with the males. All the females are badly rubbed and one from Muncie, Illinois, June 3, 1917, has the hairs of the coxae and palpi almost wholly blackish but the wings of this latter are so strongly tinged with brownish that I do not think it is referable to *proximus* Walk. It measures 7 mm.

Chrysopilus proximus Walker (Pl. III, fig. 28)

1848. *Leptis proxima* Walker, List Dipt. Brit. Mus., I, p. 214.
 1848. *Leptis simillima* Walker, List Dipt. Brit. Mus., I, p. 215.
 1848. *Leptis propinqua* Walker, List Dipt. Brit. Mus., I, p. 215.
 1904. *Chrysopila proxima* Adams, Kans. Univ. Sci. Bul., II, p. 436.
 1904. *Chrysopila propinqua* Adams, Kans. Univ. Sci. Bul., II, p. 437.
 1908. *Chrysopilus propinquus* Kertész, Cat. Dipt., III, p. 325.
 1908. *Chrysopilus proximus* Kertész, Cat. Dipt., III, p. 325.
 1908. *Chrysopilus simillimus* Kertész, Cat. Dipt., III, p. 326.

Male.—6.5 to 7 mm. Opaque black, first antennal segment, palpi, sides of face, and body in general with rather numerous erect fairly long black hairs; mesonotum and abdomen with similar hairs and, in the better preserved specimens, with more or less appressed, rather long, dirty white to yellowish or golden tomentum; femora blackish, except tip, which with tibiae and tarsi is brownish yellow; wings almost hyaline, stigma yellowish, diffused, indistinct.

Female.—Length, 6.5 to 10 mm. More brownish; not nearly so hairy, with the hairs shorter and at least in certain lights dirty whitish to yellowish; the mesonotum somewhat, and the abdomen often thickly clothed with dirty whitish to yellowish appressed rather long hairs.

I have seen a large series of specimens referable to either *propinquus* or *proximus* and believe that I am correct in the synonymy as cited. A rather hasty examination of Walker's types several years ago has led me to this conclusion as also to the conclusion that his *simillimus* is synonymous with both, certainly at least with *propinquus*. Students of the group, have in the past attempted to keep *proximus* and *propinquus* separate, but according to my present judgement they should be combined.

Specimens Examined: About 281 males and females.

NEW BRUNSWICK: 1 ♂, Younghall, July 3, 1908, (Arthur Gibson), [C. N. M.]. 4 ♂, Frederickton, June 21, 1914, (J. D. Tothill), [N. B. Dept. Agr.]. 1 ♂, Barber Dam, June 25, 1914, (J. D. Tothill), [N. B. Dept. Agr.].

NOVA SCOTIA: 1 ♂, St. John, June 29, 1901, (W. McIntosh), [U. S. N. M.]; 2 ♀, [A. N. S. P.]. 1 ♂, Truro, July 11, 1913, [C. N. M.].

QUEBEC: 1 ♂, Covey Hill, June 25, 1923, (C. H. Curran); 4 ♀, June 17, 1927, (W. S. Brown); 1 ♀, June 23, 1927; 1 ♂, June 17, 1927, (G. S. Walley); 1 ♂, 1 ♀, Hemmingford, June 27, 1923, (C. H. Curran); 2 ♂, Megantic, June 21, 1923, (C. H. Curran); 1 ♂, Strathroy, June 10, 1920, (H. F. Hudson); 1 ♀, Wakefield, July 14, 1926, (G. S. Walley); Cottage Beaulieu, August 19, 1906, (Beaulieu), [all C. N. M.]. 12 ♂, Lauzon, June 27, 29, 1919; 3 ♀, July 6, 12, 1919; 2 ♂, 1 ♀, Mount Royal, June 4, 9, 21; 1 ♂, May 15; 2 ♂, 1 ♀, Montreal, June 4, 11, 21; 1 ♂, July 4; 1 ♂, 1 ♀, St. Remi, June 13, 1920; 2 ♂, 1 ♀, St. Hilaire, June 22, 1919; 1 ♂, Joliette, July 6, [all Ouellet]; 1 ♀, [A. N. S. P.]. 2 ♂, 1 ♀, Laurentians, Terrebonne County, June 22, 1902, [A. F. Winn]. 1 ♀, Brome County, July 2, 1917, [A. F. Winn]. 1 ♀, Rigaud, [A. N. S. P.].

ONTARIO: 4 ♀, Ottawa, July 18, 1914, (G. Beaulieu); 2 ♂, July 1, 1907, (C. H. Young); 1 ♂, 1 ♀, Mer Bleue, Ottawa, June 26, 1904, (W. Metcalf); 1 ♂, 1 ♀, Orillia, July 1923, (C. H. Curran); 1 ♂, Putnam, June 26, 1925, (G. S. Walley); 1 ♀, Lynn, July 7, 1926, (G. S. Walley); 1 ♀, Sand Hill, Rideau, July 1, 1906, (J. Fletcher); 1 ♂, Jordan, June 19, 1915; and several males and females, June, (W. A. Ross); Bowmanville, June, (W. A. Ross); 4 ♂, Rigaud, June 25, 1906, (G. Beaulieu); 1 ♂, Bellville, [all Can. Nat. Mus.]. 1 ♂, Guelph, June 26, 1912; 1 ♂, Simcoe, June 23 to 30, 1915; 1 ♀, July 2 to 9, 1915, [all Ont. Agr. College].

NEW HAMPSHIRE: 1 ♀, Franconia, [B. S. N. H.]; 1 ♂, 1 ♀, July 9, 17, 1915, (C. H. T. Townsend), [U. S. N. M.]; 1 ♂, 1 ♀, (A. T. Slosson), [U. S. N. M.]; 2 ♂, 4 ♀, [A. M. N. H., ex Slosson]. "N. H.," "2000 ft.," [A. M. N. H.].

MASSACHUSETTS: 2 ♀, Springfield, (Geo. Dimmock); 2 ♂, Beverley, June 15, 1876, (Burgess); 1 ♂, June 6, 1867; 1 ♂, June 13, 1869, (Burgess), [all U. S. N. M.]; 1 ♀, July 4, 1869, [U. S. N. M., ex Riley]. 1 ♀, Forest Hills, (Jos. Bequaert), [A. M. N. H.]. 1 ♀, Boston, (Hy. Edwards), [A. M. N. H.]. 1 ♂, "Mass." June 24, 1891, [Mass. Agr. College, ex "Hatch Exp. Sta."]. 1 ♂, 1 ♀, Amherst, June 21, 23, 1904, [Mass. Agr. College].

RHODE ISLAND: 2 ♂, Buttonwoods, June 20, 1912; 3 ♂, June 22, 1912, [B. S. N. H.].

CONNECTICUT: 1 ♂, Hartford, June 8, 1893; 1 ♂, New Haven, June 10, 1910; 2 ♂, 2 ♀, June 4, 8, 1911, (A. B. Champlain), [all U. S. N. M., ex Walton]; 1 ♀, May 30, 1897, [A. N. S. P.]; 3, June 11, 1914, June 26, 1910, and June 11, 1914; 1 ♀, June 1, 1908; 1 ♂, North Branford, June 8, 1912, (B. H. Walden); 1 ♂, Meriden, June 3, 1910, (B. H. Walden); 1 ♂, Stonington, June 8, 1908, (W. E. Britton), [all Conn. Agr. Exp. Sta.].

NEW YORK: 1, Speculator, June, (D. B. Young); 1, Keene, June, (M. D. Leonard); 1, Adirondack Lodge, June, (M. D. Leonard); 1, Lawson Lake, Albany County, June, (S. C. Bishop), [all N. Y. S. M.]. 1 ♂, Kirkland, Oneida Co., June 4, 1921, (M. D. Leonard), [Cornell]. 1 ♀, Clayville, June 8, 1921, (M. D. Leonard), [C. U.]. 1 ♀, Ithaca, June 26, 1915, (R. C. Smith), [Kansas]. 1, Corinth, June, (D. B. Young), [N. Y. S. M.]. Salem, June; 1 ♂, Karner, June 19, 1914, (D. B. Young); 1 ♂, Voorheesville, May 1923, (reared from sphagnum by S. C. Bishop), [all N. Y. S. M.]. 1 ♀, Stony Clove, July 1910, [A. M. N. H.]. 4 ♂, 4 ♀, Catskill Mts., June 9 to July 30, [A. M. N. H.]. 1, Poughkeepsie, June 4, 1903, (D. B. Young), [N. Y. S. M.]. 1 ♀, Port Chester, June 22, 1916, (E. R. Kalmbach), [Biol. Surv.]. 2 ♂, 2 ♀, Ramapo, June, [Brook. Mus.]. 1 ♂, Suffern, [A. M. N. H.]. 3 ♂, 2 ♀, Mosholu and Van Cortland Park, May, (Torre-Bueno), [E. Bezzi]. 6 ♂, 6 ♀, Richmond, Staten Island, June 10 to 11, 1919, (E. J. Burns); 4, Watchogue, Staten Island; 1 ♂, New Dorp, Staten Island, [all Burns]. 3 ♀, Flatbush, Long Island, June 22, 1894, (J. L. Zabriskie), [A. M. N. H.]. 1 ♂, Sea Cliff, Long Island, [Banks].

NEW JERSEY: 2 ♂, Fort Lee, June 9, 1917, [E. J. Burns]. 1, Jersey City, June 19, 1917, [Burns]. 6 ♂, 2 ♀, Ramsey, May, June 5 to 20, 1916, (Jos. Bequaert), 1 ♂, June 12, 1912, [A. M. N. H.]. 1 ♂, Merchantville, May 26, 1904; 2 ♂, National Park, June 10, 1906; 1 ♂, Laurel Springs, May 23, 1902, [all Pa. Dept. Agr.]. 1 ♂, Paterson, (J. A. Grossbeck), [A. M. N. H.]. 1 ♂, Wenonah, May 30,

[Pa. Dept. Agr.]. 3 ♂, Snake Hill, [A. M. N. H.]. 2 ♂, Arlington, June 4, [A. M. N. H.]. 3 ♂, Ashland, June 22, 1907, (F. Haimbach), [A. N. S. P., ex Haimbach].

PENNSYLVANIA: 4 ♂, 3 ♀, Swarthmore, May 27, 1905, June 4, 1905, June 9, 1912, (E. T. Cresson, Jr.), [A. N. S. P.]. 1 ♂, 1 ♀, Jack Run, Allegheny Co., June 14, 1908, [A. N. S. P.]. 1 ♂, Edge Hill, [Brook, Mus.]. 1 ♂, Philadelphia, May 30, 1911 [Brook, Mus.]. 1 ♂, Marsh Run, York Co., June 23, 1911, (E. Daecke); 2 ♂, Hummelstown, June 6, 7, 1912, (J. N. Knull); 2 ♂, Charter Oak, June 20, 1917, (J. N. Knull), [all Pa. Dept. Agr.]. 2 ♀, New Cumberland, May 30, [U. S. N. M., ex Walton]; 2 ♂, June 16, and May 30, [Pa. Dept. Agr.]. 1 ♀, Harrisburg, June 5, 1908, [Pa. Dept. Agr.]; 10 ♂, June 9 to 24, [Pa. Dept. Agr.]; 3 ♂, 2 ♀, June 10, 12, 23, [U. S. N. M., ex Walton]. 2 ♂, Castle Rock, June 9, 1901 and June 30, 1907, [Pa. Dept. Agr.]; 1 ♂, May 11, 1906, [A. N. S. P.]. 1 ♂, Delaware County, June 14, 1905; 1 ♀, Darby, Delaware County, June 14, 1903, [A. N. S. P.]. 2 ♂, Fern Rock, Montgomery County, June 9, 1905, (F. Haimbach); 1 ♂, Germantown, June 4, 1905, (F. Haimbach); 1 ♀, Roxboro, Montgomery County, June 19, 1910, (F. Haimbach), [all A. N. S. P., ex Haimbach]. 1 ♀, Pocono Lake, July 9, 1911, (H. S. Harbeck), [A. N. S. P., ex Harbeck]. 1 ♂, Highspire, May 22, 1909; 1 ♂, 1 ♀, June 15, 19, (W. S. Fisher); 1 ♀, May 23, 1909; 1 ♀, Progress, June 6, [all U. S. N. M., ex Walton]. 3 ♂, Hazleton, June 7, 1909, [A. N. S. P., ex Dietz]. 2 ♂, "Pa." May 31, 1891, [U. S. N. M., ex Aldrich]; 1 ♂, [U. S. N. M., ex Riley].

VIRGINIA: 4 ♂, Tazewell June 9, 1915, (L. O. Jackson), [Biol. Surv.].

NORTH CAROLINA: 1 ♀, Black Mountains, June [A. M. N. H.]; 1, late May 1910, (F. Sherman), [N. Car. Dept. Agr.; Hine det.].

FLORIDA:⁵⁹

OHIO: 1 ♂, Wooster, June 24, 1917, (Q. Lowry), [N. H. Agr. College]; 4 ♂, 2 ♀, June 7, 9, 29, 1907, [Ohio Agr. Exp. Sta.].

MICHIGAN: 2 ♂, Battle Creek, [U. S. N. M., ex Aldrich]. 1 ♂, East Lansing, June 19, 1890, [Mich. Agr. College].

ILLINOIS: 2 ♂, Algonquin, (Nason?), [U. S. N. M., ex Aldrich]; 1 ♂, [U. S. N. M.]. 9 ♂, 3 ♀, Chicago, June 11, 16, 1899, [A. M. N. H.].

WISCONSIN: 1 ♂, Rochester, July 15, 1890, [A. M. N. H.]. 2 ♂, "Wis." [A. M. N. H.].

SOUTH DAKOTA: 1 ♂, "South Dakota," [U. S. N. M., ex Aldrich].

NEVADA: 3 ♂, Ormsby County, July, (C. F. Baker), [Stanford Univ.].

CALIFORNIA: 1 ♂, Berkeley Hills, Alameda County, April 20; 1 ♀, April 11, 1908, (E. T. Cresson Jr.), [A. N. S. P.]; the females somewhat smaller than most Eastern specimens of that sex].

Chrysopilus quadratus Say (Pl. III, fig. 31)

1823. *Leptis quadrata* Say, Jour. Acad. Nat. Sci. Phila., III, p. 35.

1823. *Leptis fumipennis* Say, Jour. Acad. Nat. Sci. Phila., III, p. 37.

1848. *Leptis reflexa* Walker, List Dipt. Br. Mus., I, p. 216.

1867. *Chrysopila dispar* v. d. Wulp, Tijdschr. v. Ent., x, p. 145.

1887. *Chrysopila flavida* Bigot, Bul. Soc. Zool. France, XII, p. 104.

1878. *Chrysopila quadrata* Osten Sacken, Cat. Dipt. N. A., (2nd ed.), p. 63.

1908. *Chrysopilus quadratus* Kertész, Cat. Dipt., III, p. 326.

⁵⁹ Recorded from Jacksonville by Johnson (1913: 54).

A rather variable species in coloration; thorax brownish to almost blackish, in the better preserved specimens rather densely clothed with short golden tomentum; abdomen dark brownish to dusky with caudal half of each segment, or only narrowly, or in some cases not at all, brownish yellow; the whole clothed with upright, moderately long pale or dark hairs; legs yellowish; wings either hyaline or more or less wholly tinged with dusky, but most always with a conspicuously darker area in the center including the stigmal region and running through the discal cell; female usually paler than the male.

Male.—Length, 6 to 6.5 mm. Head: Face, including bulbous portion, light grayish pollinose, the lower half or two-thirds sparsely covered with fine pale hairs, which are somewhat more abundant in some specimens than in others; proboscis, palpi and antennae brownish yellow, the two former with pale hairs.

Thorax: Dark brownish to almost blackish, in the better preserved specimens rather densely covered with short golden tomentum; scutellum the same with the caudal margin usually somewhat lighter in color and in some specimens with several long blackish hairs; pleura brownish in ground color but covered with fine pollen so as to appear light grayish; for the most part bare but in places often with a few rather long pale hairs; halteres with stalk pale yellowish, knob infuscated.

Abdomen: Brownish to almost blackish, segments nearer the tip usually darker than those toward the base, caudal border of each segment more or less broadly margined with brownish yellow; in some specimens on the first four or five segments the lighter band occupies nearly the whole caudal half, on others not more than a third and in some the caudal border is only narrowly margined with the lighter color; in these last the terminal two or three segments are wholly blackish or dark brownish and in the first group they are but narrowly margined.

Legs: Coxae same as pleura and each with a few long pale hairs; trochanters and remainder of legs pale yellowish.

Wings: Whole membrane more or less evenly tinged with brownish especially on basal half; a dark brownish subquadrate spot in center extending from the stigma (which is darker than the rest) and including it, through the discal cell; in some of the paler specimens the intensity of this spot and the brownish tinge of the rest of the wing-membrane are not as great but the boundaries of the central spot are fairly constant.

Female.—Length, 7 to 8 mm.; on the whole lighter colored than the male from which it differs chiefly in the following particulars: Head: Front brownish to almost blackish, more or less clothed with short stiff blackish hairs; remainder of head similar to that of male.

Thorax: Usually not so dark as in the male though some specimens, especially those from the Southern States, are almost blackish; mesonotum often with a more or less distinct paler line on either side of the median line, or sometimes with a darker median line; the few well preserved specimens which I have seen have the short yellow hairs on the mesonotum as in the male.

Abdomen: Usually lighter in color than that of the male and the darker bands at the base of the segments are often but slightly indicated.

Wings: Membrane as a rule not so strongly tinged with brownish as that of male and the central spot often not so dark.

Specimens Examined: About 512 males and females.

NEWFOUNDLAND: 1 ♂, Stevenville, St. George Bay, July 12, (Geo. P. Englehardt), [Brook. Mus.].

NOVA SCOTIA: 1 ♂, Truro, July 7, 1913; 1 ♂, July 26, 1913, (R. Matheson), [C. U.]. 1 ♂, West River, August 13, 1916; 1 ♂, July 23, 1913, (R. Matheson), [C. U.]. 1 ♂, Maitland, August 3, 1910, (Wm. Reiff), [Brues].

QUEBEC: 3 ♂, 1 ♀, Joliette, July 13 to 24, [Ouellet]. 1 ♂, Outremont, August, [Ouellet]. 1 ♀, Laurentians, Cerrebonne County, [Kansas]. 1 ♂, Rigaud, July 10, 1913; 2 ♂, Mount Royal, June 18, 1919 and July; 1 ♂, Lauzon, July 10, 1919; 1 ♂, "St. L. de-G," August 15, [all Ouellet]. 1 ♀, Chelsea, July 5, 1912; 1 ♀, Coney Hill, August 18, 1921, (Petch); 1 ♀, July 17, 1924, (G. S. Walley); 2 ♂, "Caradoc?" June 19 and 24, 1918, (H. F. Hudson); 1 ♀, Aylmer, July 15, 1915, (C. B. H.); 1 ♂, Bancroft, July 13, 1905; 1 ♂, Hemmingford, July 26, 1923; 1 ♂, Kazubagua, August 6, 1927, (F. P. Ide). [all C. N. M.].

ONTARIO: 1 ♂, Pt. Pelee, June 18, 1927, (F. P. Ide), [C. N. M.]. 1 ♂, Kearney, May 5, 1909; 1 ♀, July 5, 1909, [Van Duzee]. 2 ♂, 2 ♀, Burlington, June 1919, (H. C. Hockett), [Leonard]. 1 ♀, Port Hope, June 7, 1896; 2 ♂, 1 ♀, Belleville; 1 ♀, Prince Edward Evans County, July 1, 1896; 1 ♀, Ottawa, August 8, 1905, (J. Fletcher); 1 ♂, June 24, 1904; 2 ♀, July 1, 1904, (W. Metcalf); 1 ♀, July 2, 1912; 1 ♀, June 20, (Beaulieu); 4 ♂, September 3 to 7, 1917, (C. B. Hutchins); 1 ♂, August 29, 1912, (Beaulieu); 1 ♂, July 5, 1924, (F. P. Ide); 1 ♂, 2 ♀, Sudbury, June; 1 ♀, Norway Point, Lake of Bays, August 2; 1 ♂, June 28, 1922, (J. McDunnough), [all C. N. M.]. 1 ♀, Grimsby, (J. Pettit), [Ont. Agr. College]. Orillia, several males and females, July and August, (W. A. Ross); 1 ♂, 1 ♀, July 20, 1923, (C. H. Curran); 1 ♂, Strathroy, July 5, 1913, (H. F. Hudson); Jordan, several male and females, July and August, (W. A. Ross); Bowmanville, several males and females, July and August, (W. A. Ross), 4 ♂, Algonquin Park, June 18, 1922, (J. McDunnough), [all Can. Nat. Mus.]. 3 ♂, 1 ♀, Wautamic, June, (H. S. Parish), [Wash. Sta. College].

MANITOBA: 1 ♀, Aweme, July 3, 1917, (N. Criddle); 10 ♂ and 1 ♀, June and July, (N. Criddle and H. A. Robertson); 1 ♂, 1 ♀, June 26, 1923, (R. M. White); 1 ♀, [all C. N. M.].

SASKATCHEWAN: 1 ♀, Prince Albert, July 24, 1907, (J. Fletcher), [C. N. M.].

BRITISH COLUMBIA: 1 ♂, Vernon, June 18, 1920, (N. L. Cutler), [C. N. M.].

MAINE: 1 ♀, Capens, July 19, 1907, [Leonard, ex Johnson]. 1 ♂, Orono, [Maine Agr. Exp. Sta.; Lot 1615 sub. 50].⁶⁰

NEW HAMPSHIRE: 4 ♀, Franconia, [A. M. N. H., ex Slosson]; 1 ♂, 1 ♀, July 9, 11, 1915; 1 ♀, July 31, 1915, (C. H. T. Townsend), [U. S. N. M.]. 2 ♀, Mount Washington, [A. M. N. H., ex Slosson]; 2 ♀, August, [Stanford Univ.]; 1 ♂, 1 ♀, August, [Kansas]; 2 ♂, 1 ♀, near the summit, (Geo. Dimmock), [U. S. N. M.];

⁶⁰ Reported as common at Mount Desert by Johnson (1927:180).

2 ♂, 1 ♀, near Glen House, (Geo. Dimmock), [U. S. N. M.]; 1 ♂, Bretton Woods, June 30, 1909, [Leonard, ex Van Duzee]. 2 ♂, 2 ♀, White Mountains, (Morrison), [U. S. N. M.].

VERMONT: 1 ♀, Norwich, July 8, 1908, [Leonard, ex Johnson]. 1, Hartland, August 29, 1912, (P. W. Whitney), [C. T. Brues]. 1 ♂, 2 ♀, Chittenden, Rutland August 1 to 15, 1916, (Jos. Bequaert), [A. M. N. H.].

MASSACHUSETTS: 1 ♂, Bashbush Falls, June 28, 1912, (C. W. Johnson), [Leonard, ex Johnson]. 1 ♂, Woods Hole, July 2, 1905, [Leonard, ex Johnson]; 2 ♂, July 1900, (C. T. Brues); 1 ♀, July 15 to August 6, 1917, (C. E. Olsen), [A. M. N. H.]. 1 ♂, Cummington, July, 2 to 5, 1899, [U. S. N. M.]. 1 ♂, 2 ♀, "Mass." [A. M. N. H., ex Wheeler]. 1 ♀, "Mass.?" September 10, 1901, [Mass. Agr. College; "Hatch Ex. Station 9-10-01"].

RHODE ISLAND: 1 ♀, Kingston, June 22, 1906; 1 ♀, July 25, 1905; 1 ♂, June 19, (C. A. Davis), [all R. I. Agr. College]. 1 ♂, Providence, June 22, [R. I. Agr. College, ex Davis].

CONNECTICUT: 1 ♂, Cornwall, August 10, 1918, (B. H. Walden), [Conn. Agr. Exp. Sta.]. 1 ♂, Colebrook, July 20, 1905, (W. E. Britton), [Conn. Agr. Exp. Sta.]. 1 ♂, Lyme, September, 4, 1909; 1 ♀, July 30, 1910, [U. S. N. M., ex Walton]. 1, "Conn." (S. W. Williston), [Kansas].

NEW YORK: 2 ♀, Axton, June 12 to 22, 1901, (MacGillivray & Houghton); 1 ♂, Wilmington, 1000-2200 feet alt., 1 ♀, New Russia, Essex County, August, 18, 1912, (J. C. Bradley), [all C. U.]. 1, Lake Placid, August; 1, Saranac Inn, June; 1, Keene, June. (M. D. Leonard); 1, Chazy Lake, July; 1, Wells & Speculator, July, (D. B. Young), [all N. Y. S. M.]. 1 ♂, Trenton Falls, June 4, 1921, (M. D. Leonard), [C. U.]. 1 ♂, Hague, August, 1923, (M. D. Leonard), [N. Y. S. M.]. 1 ♂, Lake George, August 21, 1893; 1 ♀, August 17, 1894, (J. L. Zabriskie), [A. M. N. H.]. 2 ♂, 2 ♀, Upper Ausable Lake, July 19, 30, 1920, (Jos. Bequaert), [A. M. N. H.]. 1 ♀, Brant Lake, [Brook. Mus.]. 1 ♂, Sacandaga Park, Fulton County, June 29, 1916, (C. P. Alexander), [C. U.]. 1, Lake Bluff, Sodus, July, (S. C. Bishop), [N. Y. S. M.]. 1 ♂, Honeoye Falls, August 7, 1915, [Leonard]. 1 ♀, Batavia, August 26, 1914; 1 ♂, August 4, 1916, (H. H. Knight), [U. of Minn.]. 2 ♂, 2 ♀, July 25, 1913; 1 ♂, June 13, 1913, (H. H. Knight), [Leonard]. 1 ♂, Beaverkill, Sullivan County, August 10, 1909, (E. T. Cresson, Jr.), [A. N. S. P.]. 1 ♀, Grand Island, September 10, 1911, [Leonard, ex Van Duzee]. 1, Canandaigua Lake, July, [N. Y. S. M.]. 2 ♂, Rock City, July 1 and 4, 1916, (H. H. Knight); 1 ♂, 2 ♀, Springlake, July 22, 1918; 1 ♀, Spencer Lake, July 30, 1907; 1 ♀, Ithaca, June 25, 1886, (A. M. Shaw); 1 ♂, July 31, 1890; 1 ♀, July 24, 1890, [all C. U.]. 1 ♀, August 25, 1920, (J. L. L. Frank), [Leonard]; 1 ♀, July 6, 1916, [C. U.]; 1 ♀, July 9, 1904; 2 ♂, August 8, 1903, [R. I. Agr. College]; 1 ♂, 1 ♀, July 8, 1916, (R. C. Smith), [Kansas]; 1 ♂, July 8, 1907, [U. of Ill.]; 1 ♂, July 8, 1907; 1 ♂, July 25, 1895; 1 ♀, July 10, 1894; 1 ♀, July 1, 1897; 1 ♂, June 29, 1885, (J. H. Comstock); 1 ♀, July 30, 1885, (E. H. Sargent); 1 ♀, July 18, 1887 (S. H. Crossman); 1 ♀, July 29, 1890; 4 ♂, Coy Glen, Ithaca, September 20, 1920, (H. C. Hockett), [all C. U.]. 1 ♂, 1 ♀, Ringwood near Ithaca, July 5, 1920; 1 ♂, Tau-ghannock, near Ithaca, July 4, 1920; 1 ♀, McLean, September 11, 1920, (H. C.

Huckett); 7 ♂, 2 ♀, July 3, 1920, [all Leonard]. 1 ♀, Freeville, July 4, 1904; 1 ♂, Slaterville to Caroline, July 4, 1904; 1 ♀, July 14, 1904; 1 ♂, Clifton Springs, August 26, 1890, [all C. U.]. 1 ♂, Karner, July, (M. D. Leonard), [N. Y. S. M.]. 1 ♂, Slingerlands, July 1923, (J. Van Deloo), [N. Y. S. M.]. 1 ♂, Marlborough, [Brook. Mus.]. 2 ♂, 1 ♀, Onteora Mountains, Greene County, 2500 feet alt., (L. O. Howard), [U. S. N. M.]. 6 ♂, 5 ♀, Catskill Mountains, June to August, [A. M. N. H.]. 1 ♀, Pine Island, July 3, 1917, (S. W. Frost), [C. U.]. 1 ♂, New Dorp, S. I., [E. J. Burns]. 1 ♂, 1 ♀, Watchogue, July 21, 1920, [E. J. Burns]; 1 ♂, July 19, [Davis]. 1 ♂, 1 ♀, Lott Wood, Flatbush, Long Island, July 19, 1890, (J. L. Zabriskie), [A. M. N. H.]. 3 ♂, Pennequid Barrens, Coram, Long Island, July 8, 1920, (Jos. Bequaert), [A. M. N. H.]. 1 ♀, Sands Point, Long Island, July 10, 1920, [E. J. Burns].

NEW JERSEY: 1 ♂, Moorestown, June 21, 1924, (H. C. Hallock), [Cornell]. 1 ♂, Ridgewood, July 9, 1910; 1 ♀, Sept. 25, 1910, [Leonard]. 1 ♂, Orange Mountains, August; 1 ♂, 1 ♀, Forest Hill, June; Brookside, "Morr." County, July; 1 ♂, 2 ♀, West Orange, July; 1 ♂, 1 ♀, Greenwood Lake, August 20, 1916, (Jos. Bequaert); 1 ♀, Palisades, July 5, 1920, (E. J. Burns), [all A. M. N. H.]. 1 ♀, Delaware Water Gap, July 14, [Brook. Mus.]. 1 ♀, Merchantville, June 28, 1891; 1 ♂, Dover, June 23, 1892; 1 ♂, Newark, June 16, 1892, [all U. of Ill.]. 1 ♀, "N. J.," [A. N. S. P.]. 1 ♂, 1 ♀, "N. J." [A. M. N. H.; donated by Chas. Palm]. 1 ♀, Anglesea, June 11, 1905, (H. S. Harbeck); 2 ♀, Trenton, July 5, 1908, August 12, 1909, (H. S. Harbeck), [A. N. S. P., ex Harbeck]. 1 ♀, Five-mile Beach, May 26, (F. Haimbach); 1 ♀, Wenonah, July 15, (F. Haimbach), [A. N. S. P., ex Haimbach].

PENNSYLVANIA: 2 ♂, 1 ♀, Castle Rock, Delaware County, June 14, 1908, August 5, 1906, [A. N. S. P.]. 4 ♂, 4 ♀, Germantown, July 10, 1901, June 26, 1904, July 2, 1904, May 26, 1905, June 18, 1905, (H. S. Harbeck), [A. N. S. P., ex Harbeck]. 2 ♂, Roxboro, June 9 and 27; 1 ♀, Edge Hill, Montgomery County, June 25; 1 ♂, 1 ♀, Olney, Montgomery County, June 17; Philadelphia, July 15, 1893; (all F. Haimbach), [all A. N. S. P., ex Haimbach]. 2 ♂, Philadelphia, June 11, 1891, [U. of Ill.]; 4 ♂, [Cornell]. 2 ♂, Hummelstown, July 1, 1917, (J. N. Knull), [Pa. Dept. Agr.]; 1 ♀, August 7-11, 1908, [U. S. N. M., ex Walton]. 1 ♂, Inglenook, June 3, 1917, (J. N. Knull), [Pa. Dept. Agr.]; 1 ♂, June 20, 1909, [U. S. N. M., ex Walton]. 1 ♀, Shiremanstown, June 18, 1915, (W. S. Fisher), [U. S. N. M., Div. Forest Ins.]. 1 ♂, Linglestown, August 4, 1915, (W. S. Fisher), [U. S. N. M., Div. Forest Ins.]. 1 ♂, 1 ♀, Highspire, June 19, (W. S. Fisher), [U. S. N. M., ex Walton]. 1 ♂, 1 ♀, Harrisburg, June 6 and 7, [U. S. N. M., ex Walton]; 5 ♂, 1 ♀, June 18, 1916, [C. S. Anderson]. 1 ♂, Marsh Run, July 18, 1909, [U. S. N. M., ex Walton]. 5 ♂, 1 ♀, Hazleton, July 9 and 13, August 9 and 11, August 1, 1910, [A. N. S. P., ex Dietz]; 1 ♂, White Mills, Wayne County, [Brook. Mus.]. 1 ♀, Delaware Water Gap, [A. M. N. H., ex Slosson]. 1 ♂, Bucks County, June 25, 1895, [Brook. Mus.]. 2 ♂, 3 ♀, Swarthmore, July 9, 1905, July 8, 1906, September 23, 1906, (E. T. Cresson, Jr.), [A. N. S. P.]. 1 ♀, Heckton Mills, July 8, 1910, (P. R. Myers), [U. S. N. M.]. 1 ♀, Rockville, July 14, 1910, (P. R. Myers)

[U. S. N. M.]. 1 ♂, Delaware County, August 27, 1904, (E. T. Cresson, Jr.), [A. N. S. P.]. 1 ♀, "Pa.," [A. M. N. H., ex Wheeler]. 1 ♂, "Pa.," [Kansas].

MARYLAND: 1 ♂, Plummer's Island, June 6, 1916, (collected at light by R. C. Shannon), [Shannon]; 1 ♂, June 2, 1912; 1 ♂, May 31, 1908; 1 ♂, June 23, 1907; 1 ♂, June 7, 1914, (all W. L. McAtee), [Biol. Surv.]; 2 ♀, June 30, 1907; 1 ♀, July 7, 1907; 1 ♂, July 4, 1907; 1 ♂, July 21, 1907, (all A. K. Fisher), [Biol. Surv.]; 1 ♂, 1 ♀, July 2, 1907, (H. S. Barber); 1 ♂, June 1903, (Wm. Palmer); 1 ♀, June 11, 1914, (R. C. Shannon); 1 ♂, Cabin John Bridge, June 13, 1915, (R. C. Shannon); 1 ♀, August 9, 1916, (R. M. Fouts); 1 ♂, May 23, 1911, (P. R. Myers); 1 ♀, Marlboro, June 19, 1916, (R. C. Shannon); 1 ♂, Forest Glen, June 1, 1913, (F. Knab), [all U. S. N. M.]. 1 ♂, Bladensburg, June 13, 1916, (F. R. Cole), [Cole].

DISTRICT OF COLUMBIA: 1 ♀, Chain Bridge, Sept. 8, 1912, (Knab and Malloch); 1 ♀, Rock Creek, July 24, (C. H. T. Townsend), [all U. S. N. M.].

VIRGINIA: near Plummer's Island; 1 ♂, June 4, 1916; 1 ♂, Dead Run, June 9, 1915; 1 ♂, June 6, 1916, (R. C. Shannon); 1 ♀, May 11, 1916, (C. T. Greene), [all U. S. N. M.]; 1 ♀, June 22, 1915, [Shannon]. 1 ♂, Bluemont, June 13, 1916, (J. N. Knull), [U. S. N. M., Div. Forest Ins.]. 1 ♂, Great Falls, June 5, 1917, (C. T. Greene), [U. S. N. M., Div. Forest Ins.]; 1 ♀, June 25, 1909, (H. L. Vierick), [U. S. N. M.]. 1 ♀, Petersburg, Chesterfield County, June 1, 1917, (Jos. Bequaert), [A. M. N. H.]. 1 ♂, Glencarlyn, June 15, 1913; 1 ♀, June 15, 1916, (F. Knab), [U. S. N. M.].

WEST VIRGINIA: 1 ♂, Fairmont, June 22, 1908, (E. T. Cresson, Jr.), [A. N. S. P.].

KENTUCKY: 1 ♀, Ashland, May 28, 1899, [Hine].

NORTH CAROLINA: 1 ♂, 3 ♀, Black Mountains, June; 5 ♂, 1 ♀, Valley of Black Mountains, June 24 to 30, 1906; 1 ♀, July 26, 1906; 1 ♂, July 23, 1906; 1 ♀, July 24, 1906; 1 ♀, June 22, 1906; 1 ♂, July 6, 1906; 1 ♀, July 9, 1906, (all Wm. Beutenmueller), [all A. M. N. H.]. 2 ♂, "N. Car.," [U. S. N. M.].

GEORGIA: 1 ♂, Rabun County, July 1910, [Davis].

FLORIDA: 1 ♂, Atlantic Beach, [A. M. N. H., ex Slosson].

OHIO: 1 ♂, Wooster, September 12, 1896, [Ohio Agr. Exp. Sta.; acc. 3094]. 1 ♂, Senecaville, August 26, 1916, (Q. Lowry), [N. H. Agr. College]. 1 ♀, Jefferson, Ashtabula County, Sept. 10, 1911, (R. J. Sim), [Hine]. 1 ♀, Cincinnati, July 10, 1917, (Q. Lowry), [N. H. Agr. College]. 1 ♂, Ira, Summit County, August 22, 1908; 2 ♂, [Hine]. 1 ♂, Medina, June 24, [Hine]. 1 ♂, "Ohio," August, (H. J. Reinhard), [Tex. Agr. College]. 1 ♂, "Ohio," [A. N. S. P.]. 3 ♂, 2 ♀, Ohio?, July 1 to 8, 1907, [Ohio Exp. Sta.].

INDIANA: 2 ♂, Lafayette, September 7, 1916; 3 ♂, 3 ♀, July 1 to 18, (J. M. Aldrich); 1 ♂, 1 ♀, Hammond, June 24, 1915, (J. M. Aldrich), [all U. S. N. M., ex Aldrich]. 2 ♂, 1 ♀, Wolf Lake, July 14, 1895, [A. M. N. H., ex Wheeler].

ILLINOIS: 2 ♂, Augerville, June 6, 1915; 5 ♂, Urbana, July 18, 20, 1917; 1 ♂, Salt Fork, Muncie, June 3, 1917; 1 ♂, Sept. 1, 1912; 1 ♀, Stony Ceeek, June 23, 1912; 2 ♀, Galena Junction, July 8, 1917; 2 ♂, Algonquin, (Wm. A. Nason); 1 ♂, June 15, 1896; 1 ♀, July 8, 1897, [all U. of Ill.]. 5 ♂, Chicago, July 6, 1895; 2 ♂, June 10, 1899; 2 ♂, June 17, 1899; 1 ♂, "N. Ill.," [all A. M. N. H., ex Wheeler]. 1 ♂, "Ill.," [A. N. S. P.]; 5 ♂, June 23; 1 ♂, July 15, 1897, [C. T. Brues].

MICHIGAN: 1 ♀, Charlevoix, August 6, 1894, (R. H. Wolcott), [Neb. Agr. Exp. Sta.]. 2 ♂, 1 ♀, Little Bear Lake, Grand Junction, July 15, 1914, [U. of Ill.]. 1 ♀, Onota Township, Alger County, July 3, 1916, (A. W. Andrews), [A. N. S. P.]. 6 ♂, 2 ♀, various dates, June to Sept., 1890 to 1916 in Mich. Agr. College collection, probably from the State.

WISCONSIN: 6 ♂, 4 ♀, Beaver Dam, July 1, 4, 1909, (W. E. Snyder), June 12, 1911 [A. N. S. P. ex. Dietz]. 3 ♂, Milwaukee, June 23, 26, and 28, 1895, [A. M. N. H.]. 1 ♂, 1 ♀, Polk County, (C. F. Baker), [U. S. N. M., ex Aldrich]. 1 ♀, Price County, August 20, 1897, [A. M. N. H., ex Wheeler]. 1 ♀, Lake Superior, [Wash. State College]. "Wis." 4 ♂, [A. M. N. H.].

IOWA: 2 ♀, Ames, [U. S. N. M., ex Aldrich]. 1 ♂, "Iowa," [U. S. N. M.; Acc. Cat. 428].

MINNESOTA: 1 ♂, 1 ♀, St. Paul; 1 ♀, St. Anthony Park, July 18, 1918; 1 ♀, Twin Lake, June 29, 1919, (H. H. Knight); 1 ♀, Itasca, June 19, 1914; 4 ♂, 2 ♀, Olmstead County, June and July, (C. N. Ainslee); 1 ♂, 1 ♀, Ramsey County, July 3, 1920, (H. H. Knight); 2 ♂, 2 ♀, Hennepin County, [all Univ. of Minn.]. 1 ♀, Luggar, [U. S. N. M., ex Aldrich].

MISSOURI: 2 ♂, Columbia, May 26 to June 8, 1906, (C. R. Crosby), [Cornell]. 1 ♀, Cadet, [U. S. N. M.]. 1 ♀, Kansas City, May 30, (F. J. Fall), [Kansas]. 1 ♂, St. Louis, July 12, 1877, [U. S. N. M., ex Riley].

KANSAS: 1 ♀, Onaga County, (Crevecoeur); 1 ♂, [U. S. N. M.]. 2 ♂, Riley County, June 14, (Poponoe), [Kansas]. 1 ♂, Douglas County, 900 feet alt., June, [Kansas]. 1 ♂, "Kans." [U. S. N. M.].

COLORADO: 3 ♂, "Colo.," [U. S. N. M.].

NEBRASKA: Lincoln, 1 ♂, June 28, 1910, (R. W. Dawson); 1 ♂, 1 ♀, 1150 feet alt., June 15, 1908, (C. H. Gable); 2 ♂, 1 ♀, West Point, 1150 ft., June 9 to 24, (C. H. Gable), [all Neb. Agr. Exp. Sta.]. 3 ♂, 3 ♀, "Nebraska," [U. S. N. M.].

NORTH DAKOTA: 1 ♀, Turtle Mts., June 20, 1918, (L. Metigosche), [U. S. N. M., ex Aldrich].

SOUTH DAKOTA: 1 ♀, Brookings, [U. of Minn.]. 1 ♂, Big Stone City, [U. S. N. M., ex. Aldrich]. 2 ♂, 1 ♀, "S. Dak.," [U. of Minn.]. 2 ♂, 2 ♀, (J. M. Aldrich), [U. S. N. M.].

MONTANA: 1 ♂, Gallatin County, 5000 feet alt., June 16, 1904, (A. D. Hastings), [Mont. Agr. Exp. Sta.].

WASHINGTON: 3 ♂, 1 ♀, Waubamick, June, (H. S. Parish), [Wash. State College].

CALIFORNIA: 1 ♂, "California," [U. S. N. M.].

Chrysopilus rotundipennis Loew (Pl. III, fig. 25)

1861. *Chrysopila rotundipennis* Loew, Berl. Ent. Zeitschr., v, p. 317.

1908. *Chrysopilus rotundipennis* Kertész, Cat. Dipt., III, p. 326.

General color brownish yellow to brownish; mesonotum with three more or less distinct darker stripes; halteres yellowish; knobs somewhat infuscated; legs yellowish, tibiae slightly tinged with dusky, tarsi brownish, darker toward tip; arista distinctly pubes-

cent; eyes of male separated by about the width of the ocellar tubercle; wings relatively broader and more rounded than in any other member of the genus, veins pale, stigma small.

Female.—Length, 6 to 7 mm. Head: Front distinctly not as wide as eye, only one-half to two-thirds its width, dark brownish or grayish pollinose, bare; face including, bulbous part, light grayish pollinose, bare; palpi yellowish, tinged with brownish, sparsely covered with rather long blackish hairs which in some lights may appear pale; proboscis yellowish with a few pale hairs; antennae yellowish brown; arista very slender, when viewed through a hand-lens distinctly pubescent.

Thorax: Mesonotum brownish yellow, with a median darker stripe and sometimes a short stripe at front and back on either side of this; a tuft of stiff black hairs a short distance behind the humeral calli; scutellum brownish yellow; pleura yellowish; halteres with stem yellowish, knob infuscated.

Abdomen: Yellowish brown or subfuscous, sparsely clothed with short, pale yellowish tomentum.

Legs: Coxae, trochanters, and femora yellowish or pale yellowish; tibiae yellowish, slightly tinged with brownish; tarsi brownish, toward tip more or less infuscated.

Wings: Relatively broader and more rounded at apex than those of any other species of the genus; membrane hyaline; a small tuft of stiff black hairs on the swelling of the costal vein near its articulation with the thorax; stigma small, pale brownish.

Male.—(Here described for the first time). Length, 5.5 to 6 mm. Very similar to the female; the front, however, is separated by only about the width of the ocellar tubercle, is without hairs and with the sides nearly parallel, which last character is as in the female; abdomen usually somewhat paler.

Type.—1 male; labelled "Type, Loew, Ga., Gerhard [collector] rotundipennis." [Museum of Comparative Zoology]. This is the only specimen in the series.

Specimens Examined: 29; 19 males, 10 females.

MASSACHUSETTS: 1 ♂, Fall River, July 19, 1919, (N. S. Easton), [B. S. N. H.].

RHODE ISLAND: 1 ♀, Buttonwoods, July 24, 1911, [B. S. N. M.].

NEW YORK: 1 ♀, South Wales, July 9, 1911, (M. C. Van Duzee), [Leonard].

NEW JERSEY: 4 ♂, Ballinger's Mill, August 8, 1926, (H. C. Hallock), [C. U.].

PENNSYLVANIA: 1 ♀, and several other specimens, Fairmount Park, Philadelphia, July 14, 1891, [C. W. Johnson]. 1 ♂, Fern Rock, June 29, 1905, [A. N. S. P., ex Haimbach]. 1 ♂, Ephrata, July 21, 1919, (W. R. Walton), [U. S. N. M., ex Walton].

MARYLAND: 1 ♂, Bladensburg, June 23, 1916, (R. C. Shannon), [U. S. N. M.]. 1 ♀, Laurel, July 8, 1912, (E. B. Marshall), [U. S. N. M.]. 1 ♀, High Island, July 1, (N. Banks?), [N. Y. S. M.]. 1 ♂, "Md." [A. N. S. P.].

DISTRICT OF COLUMBIA: 1 ♀, Washington, July 14, (A. N. Caudell), [U. S. N. M.].

VIRGINIA: 1 ♂, Glencarlyn, June 30, [A. N. S. P., ex Banks]. 1 ♂, July 4; 1 ♀, June 28, Falls Church, (N. Banks?), [A. M. N. H.]. 3 ♂, Roslyn, July 11, 1913,

(R. C. Shannon), [U. S. N. M.]. 1 ♀, Rock Creek, July 27, 1913, (R. C. Shannon), [U. S. N. M.]. 1 ♂, 1 ♀, Boykins, June 10, 1895, [U. of Ill.].

NORTH CAROLINA: 1 ♂, Hertford County, June 9, 1895, [U. S. N. M., ex Aldrich].⁶¹

GEORGIA: *Type*, [M. C. Z.]. "S. Ga.," (Morrison), [U. S. N. M.].

FLORIDA: 1 ♂, Jacksonville, April 23, (A. T. Slosson), [A. M. N. H.]. 1 ♀, Crescent City, April 22, 1908, (M. C. Van Duzee), [A. M. N. H.].

ALABAMA: 1 ♀, Dauphine Island, May 18, 1911, [A. M. N. H.]; "Chordeiles 95197".

This species is easily recognizable by the broad, rounded wings and the distinctly pubescent arista, the narrow front of the female and dichoptic eyes of the male and lastly from the rather prominent tuft of black hairs at the base of the costal vein. Because of the pubescence of the arista, the width of the front, and the shape of the wings it may form a new genus.

***Chrysopilus testaceipes* Bigot**

1887. *Chrysopila testaceipes* Bigot, Bul. Soc. Zool. France, XII, p. 105.

1908. *Chrysopilus testaceipes* Kertész, Cat. Dipt., III, p. 327.

Black in ground color, the better preserved specimens densely covered on the mesonotum and abdomen with golden appressed tomentum; face and pleura grayish pollinose; femora yellowish, sometimes entirely or only towards apex tinged with brownish; tibiae somewhat darker than femora and tarsi brownish; wings almost clear, stigma not very distinct and brownish yellow.

Male.—Length 5 to 6 mm. Head: Antennae black, somewhat grayish pruinose, bare; palpi only moderately long and with moderately long, fairly numerous whitish to yellowish hairs; face bare, black, overlaid with grayish pollen; below and behind the eyes rather numerous and rather long yellowish hairs; ocellar tubercle prominent, grayish pollinose and with several long black hairs.

Thorax: Blackish; mesonotum densely golden tomentose with sparse longer yellowish hairs on sides of disc; scutellum also golden tomentose and with longer yellowish hairs towards caudal border; pleura grayish pollinose with long yellowish hairs in front of halteres; halteres yellowish, the knobs more or less infuscated.

Legs: Coxae grayish pollinose like the pleura, with sparse, long yellowish hairs; femora typically yellowish but often tinged more or less especially towards the apex with brownish; tibiae about like the femora but usually somewhat darker on the whole, especially towards apex; tarsi brownish, except towards base of first segment, which is brownish yellow.

Wings: Membrane almost hyaline; veins brownish yellow to brownish; stigma rather elongate, diffuse, brownish yellow.

Female.—Length, 6 to 6.5 mm. Like the male except that front has a brownish

⁶¹ Recorded by Johnson (1897: 120) from Pendleton.

cast to the pollen and with sparse short black hairs and sparser golden tomentum, which latter in better preserved specimens, may I presume, be thicker; also, if I associate the two sexes correctly the stigma is darker and more distinct in the female.

Specimens Examined: 6; 5 males, 1 female.

OREGON:⁶²

CALIFORNIA: 1 ♂, Saugus, Los Angeles County, May 12, 1918, (F. M. Jones), [A. N. S. P.]. 1 ♀, San Jacinto, May 29, 1917, (E. P. Van Duzee), [A. N. S. P.].

NEW MEXICO: 1 ♂, Buelah, June 29, 1902, [A. N. S. P.]; 1 ♂, July 27, (T. D. A. Cockerell); 1 ♂, August, [U. S. N. M.]. 1 ♂, Las Vegas, August 1, 1907, (Oslar), [A. N. S. P., ex Dietz].

COLORADO:⁶³

***Chrysopilus thoracicus* Fabricius** (Pl. III, fig. 29)

1805. *Leptis thoracica* Fabricius, Syst. Ant., p. 70.

1840. *Chrysopila thoracica* Macquart, Dipt. Exot., II, pt. I, p. 32.

1908. *Chrysopilus thoracicus* Kertész, Cat. Dipt., III, p. 327.

Velvety black; face pale satiny brown in certain lights; mesonotum with dense golden tomentum; abdomen with a patch of golden or silvery tomentum on either side of hind border of each segment; halteres and femora black; tibiae and tarsi yellowish or brownish yellow; wings with membrane on each side of veins broadly bordered with brown so that practically whole wing is a smoky dark brown in color.

Male.—Length 10 to 12 mm. Head: Front velvety black; face black in ground color but in certain lights a more or less pale satiny brown, sides well clothed with long brownish hairs, bulbous portion brownish black in all lights; palpi and proboscis blackish, the former thickly covered with long brownish hairs; antennae blackish, first segment with rather long blackish hairs; ocellar triangle prominent, velvety black, with a few short black hairs, ocelli whitish.

Thorax: Mesonotum covered with a solid patch of golden tomentum which is often wanting in the center in somewhat rubbed specimens thus revealing the velvety-black ground color; scutellum dull black, sparsely clothed with long, rather pale hairs, especially on the caudal border, and often with a few short appressed golden hairs in front. Pleura semi-shining, brownish black, paler at the sutures, bare except for a tuft of pale hairs just in front of the halteres; halteres blackish, base of stalk brownish.

Abdomen: Velvety black, caudal border of first five segments each with a band of short, appressed, golden or silvery tomentum which is more or less interrupted in the middle, thus forming two rows of tufts.

⁶² Recorded from Hood River by Cole and Lovett (1921: 236).

⁶³ Recorded from Cheyenne Canyon, in July and Colorado Springs, in August, by Tucker (1907: 89).

Legs: Coxae semi-shining, blackish, with long blackish hairs, for the most part located in front on fore and middle pairs and mostly on the outer side on hind pair; trochanters blackish with short hairs; femora, excepting sometimes extreme tip, blackish; tibiae and first tarsal segment brownish yellow; remainder of tarsi infuscated.

Wings: Whole membrane distinctly tinged with brownish, but the costal and subcostal cells, and cell R_1 , except at the base, wholly dark brown; all the veins broadly bordered with dark brown.

Female.—Length, 10 to 13 mm., but averaging on the whole somewhat larger than the male; similar to the male with the following exceptions: front velvety black, bare; hairs of face apparently not so long on upper portion, antennae with shorter hairs on first segment and these mostly on the lower surface.

Specimens Examined: About 463 males and females.

ONTARIO: Several males and females, Jordan, May and June, (W. A. Ross), [C. N. M.]; 1 ♀, June 20, 1914; 1 ♀, July 15, 1912, Grimsby, [Ont. Agr. College].

MAINE:⁶⁴

NEW HAMPSHIRE:⁶⁴ The above statement applies here also.

CONNECTICUT: 1 ♀, Hartford, May 18, 1893; 1 ♂, 1 ♀, June 11, 1893, [U. S. N. M.]; 1 ♀, May 31, 1896; 1 ♂, June 8, 1893, [A. N. S. P.]. 1 ♀, New Haven, June 11, 1905, (B. H. Walden), [Leonard]; 1 ♀, June 19, 1910, (A. B. Champlain); 1 ♂, June 9, 1905, (B. H. Walden); 1 ♀, June 8, 1904, (W. E. Britton), [all Conn. Agr. Exp. Sta.]; 1 ♀, June 5, 1910, (Champlain and Walton), [U. S. N. M., ex Walton]. 1 ♂, Darien, June 11, 1912, [Leonard]. 1 ♂, Danbury, June 15, 1909, (H. E. Smith), [M. C. Z.]. 1 ♀, Colebrook, June 23, 1914, (C. Gordan Hewitt), [C. N. M.]. 1 ♀, Guilford, June 15, 1919, (K. F. Chamberlain); 1 ♂, Wallingford, June 1910, (D. J. Caffrey); 1, Westville, June 10, 1899, (W. E. Britton); 1, Rainbow, June 6, 1903, (W. E. Britton); 1, Yalesville, June 27, 1907, (Walden); 1, Caanan, June 14, 1916, (M. P. Zappe), [all Conn. Agr. Exp. Sta.]. 3 ♀, Pleasant Valley, (J. Bequaert), [A. M. N. H.].

MASSACHUSETTS: 1 ♀, Amherst, June 15, 1904, [Mass. Agr. College]. 1 ♀, Springfield, (Pollard); 1 ♀, Wildbraham, June 4, 1903, [U. S. N. M.]. 1 ♂, "Mass." [A. M. N. H., ex. Wheeler]. 18 ♂, 16 ♀, presumably from Massachusetts [Mass. Agr. College].⁶⁵

NEW YORK: 1 ♀, Honeoye Falls, June 22, 1913, (M. D. Leonard), [Leonard]. 1 ♀, Rochester, June 20, 1891, (J. M. Aldrich), [U. S. N. M., ex Aldrich]; 1 ♀, June 21, 1907, (J. L. Zabriskie), [A. M. N. H.]. 2 ♂, 8 ♀, Batavia, June 9 to 21, 1913, (H. H. Knight), [Leonard]. 2 ♀, Genesee County, June 18, 1916, (Wm. T. Davis), [Davis]. 1 ♀, Portage, June 22, 1916, (Wm. T. Davis), [Davis]. 1, Pike, [N. Y. S. M.]. 2 ♀, Colden, June 7, 1908, (M. C. Van Duzee), [Van Duzee]. Westfield, in List Ins. N. Y., p. 760. 50 + ♂ & ♀, Tompkins County, including

⁶⁴ Recorded from these states by Lewis Hood (1892: 283), but Johnson considers the records doubtful.

⁶⁵ Recorded by Johnson (1925: 105) from the "Berkshire and Connecticut River Valley Areas."

McLean, Ringwood, Taughannock, and Ithaca and vicinity, June to July, 1872 to 1920, (various collectors), [mostly C. U.]. 1 ♀, Interlaken, June 20, 1915, [C. U.]. 1, Albany, June, (D. B. Young); 1, Voorheesville, (M. D. Leonard); 1, Castleton, June, (A. J. Lintner); 1, Nassau, June, (D. B. Young); 1, Bethlehem, May and June, (J. M. Aldrich); 1, Clinton Heights, 1, Cropseyville, June, (M. D. Leonard), [all N. Y. S. M.]. 1 ♀, Hudson, June 24, 1917, [Conn. Agr. Exp. Sta.]. 1, North Chatham, June, [N. Y. S. M.]. 2 ♂, 3 ♀, Binghamton, [A. N. S. P., ex Dietz]. 1, Poughkeepsie, May, (D. B. Young), [N. Y. S. M.]. 1 ♂, 4 ♀, Ramapo, May 11, 12, (Wm. T. Davis), [Davis]. 1 ♂, West Point, June 4, 1911; 1 ♀, June 18, 1912, (Wm. T. Davis), [Davis]. 1 ♀, New York City, June 20, 1893, (E. B. Southwick); 1 ♂, Katonah, June 1908, (Wm. Beutenmueller); 1 ♀, Moshulu; 4 ♂, 34 ♀, (?) West Farms, New York City, (J. Angus); 3 ♂, Nyack, May 22, 1884; 5 ♀, May 22, 1883 and 1884; 1 ♂, Suffern, [all A. M. N. H.]. 3 ♂, 6 ♀, Staten Island, May and June, (Wm. T. Davis), [Davis]. 9 ♂, 7 ♀, Richmond, S. I., June 9, 1919, (E. J. Burns), [Burns]; 1 ♂, June 16, (C. L. Pollard), [Staten Id. Mus.]. 2 ♂, 1 ♀, New Dorp, Staten Island, June 3, 1919, (E. J. Burns), [Burns]. 1 ♂, Tottenville, Staten Island, (E. J. Burns), [Burns]. 1 ♀, Astoria, Long Island, [A. M. N. H.]. 1, Jamaica, Long Island, June, [Davis]. 1, Central Park, Long Island, July, [A. M. N. H.]; 2 ♀, (C. F. Groth), [A. M. N. H.]; 2 ♀, [A. M. N. H.]; "No. 652 Hy. Edwards"; 2 ♀, [A. M. N. H.]; one is June 1 "No. 355"; 2 ♀, [U. S. N. M.]; 1 ♂, 2 ♀, (A. T. Slosson), [A. M. N. H.]; 4 ♂, 2 ♀, [A. M. N. H.].

NEW JERSEY: 1 ♂, 1 ♀, Newfoundland, May 28, 1910, (Wm. T. Davis), [Davis]. 1 ♂, Millburn, June 5, 1918, (J. Bequaert); 5 ♂, 2 ♀, Ramsey, June 14, 1916, (J. Bequaert); 3 ♂, June 2 and 13, 1912, [all A. M. N. H.]; 1 ♂, June 16, 1917, [Conn. Agr. Exp. Sta.]. 1 ♂, 1 ♀, Montclair, May 21, 29, 1916, (E. J. Burns), [Burns]; 1 ♂, 1 ♀, (in coitu), June 13, 1916, (E. J. Burns), [Burns]. 2 ♀, Ramapo Mountains, June 20, 1910, [Staten Id. Mus.]. 1 ♂, 1 ♀, Long Branch, June 11, 1900, (C. W. Johnson), [Brook. Mus.]. 2 ♀, Rutherford, May 31, (Wm. T. Davis), [Davis]. 1 ♂, Newfoundland, May 26 to 30, 1910; 1 ♀, Snake Hill; 1 ♀, New Brunswick, May 28, [all A. M. N. H.]. 3 ♂, Guymard, June 9, 1910, [A. M. N. H. and Conn. Agr. Exp. Sta.]. 1 ♂, 4 ♀, Paterson, May 21-June 17, [A. M. N. H.]. 2 ♀, Dover, June 17, [U. of Ill.]. 1 ♀, Bergen County, May 27, 1919, (E. D. Quirsfeld), [Neb. Agr. Exp. Sta.]. 1 ♀, Great Notch, June 10, (Broadwell); 1 ♂, 1 ♀, Hemlock Falls, June; 1 ♂, West Orange, June; 1 ♀, Brookside, July; 1 ♂, 1 ♀, Singac, July, [all Conn. Agr. Exp. Sta.]. 1 ♀, Great Piece Meadow, May 30, 1919, [A. M. N. H.]. 1 ♂, 1 ♀, Gloster, June 4, 1916, (E. R. Kalmbach), [Biol. Surv.]. 2 ♂, 1 ♀, Ridgewood, July 19, 1910, (M. D. Leonard), [Leonard]. 1 ♀, Arlington, June 4; 3 ♀, Alpine; 1 ♀, Fort Lee, [all A. M. N. H.].

PENNSYLVANIA: 2 ♂, 3 ♀, Swarthmore, May 28 to June 4, 1905, (E. T. Cresson, Jr.), [A. N. S. P.]. 3 ♂, 2 ♀, Philadelphia, [C. U.]; 1 ♂, 1 ♀, May 31, 1891, [U. of Ill.]; 1 ♀, June 7, 1913, [A. N. S. P.]; 3 ♀, Philadelphia, June 13, 1917, (F. M. Trimble), [Pa. Dept. Agr.]. 1 ♂, 1 ♀, Montgomery County, June 6; 1 ♂, 1 ♀, Hunter's Run, May 30, 1912; 2 ♀, Cly, May 27, 1916; 2 ♂, 1 ♀, Inglenook, May 26, 1911 and 1918 and June 1, 1913, (H. B. Kirk); 1 ♀, Glenside, May 30, 1904, (E. Daecke), [all Pa. Dept. Agr.]; 2 ♂, 1 ♀, June 4 and 16, (H. S. Harbeck).

[A. N. S. P., ex Harbeck]. 4 ♀, Castle Rock, June 9 and 16, 1901; 1 ♂, 6 ♀, Linglestown, June 2, 1918, (C. S. Anderson); 2 ♂, 1 ♀, Charter Oak, June 20-21, 1917, (J. N. Knull), [all Pa. Dept. Agr.]. 3 ♀, Delaware Water Gap, (A. T. Slosson) [A. M. N. H.]. 1 ♂, 1 ♀, Mount Pocono, June 9 to 19, 1906, (P. P. Calvert); 1 ♀, Harvey's Lake, Luzerne County, June 16, 1905, (H. Skinner); 1 ♂, 1 ♀, Upsala, June 2, 1906; 1 ♂, 4 ♀, [A. N. S. P.]. Germantown, May 25 to June 20, (H. S. Harbeck), [A. N. S. P., ex Harbeck]. 3 ♂, 7 ♀, Roxboro, May 26 to June 3, (F. Haimbach), [A. N. S. P., ex Haimbach]. 1 ♀, Alleghany, June 3, 1889, [U. of Minn.]; 1 ♀, July 1, 1891, [U. S. N. M., ex Aldrich]. 1 ♂, 2 ♀, North East, July 6 to 9, 1916, (R. A. Cushman), [U. S. N. M.]. 1 ♂, 1 ♀, Progress, June 6; 1 ♂, Heckton Mills, May 31, 1909; 1 ♂, 1 ♀, Pembroke; June 5, [all U. S. N. M., ex. Walton]. 1 ♂, 1 ♀, Jeanette, [U. S. N. M., ex Aldrich]. 2 ♂, 2 ♀, Hazleton, June 4, 1913, (W. G. Dietz), [A. N. S. P., ex Dietz]. 1 ♀, "Penna." [Kansas]. 1 ♂, 1 ♀, "Penna." [U. of Minn.].⁶⁶

MARYLAND: 1 ♂, 1 ♀ (in coitu and many others seen by Shannon in coitu on June 4); 1 ♂, Cabin John, June 4, 1916, (R. C. Shannon); 2 ♀, Plummer's Island, May 28 and 30, (R. C. Shannon); 1 ♀, May 25, 1902, (H. S. Barber), [all U. S. N. M.]. 1 ♂, 1 ♀, June 17, 1913, (W. L. McAtee), [Biol. Surv.]. 1 ♂, 2 ♀, College Park, 1914, [Pa. Dept. Agr.]; 1 ♂, 2 ♀, 1914, (G. W. Barber), [G. W. Barber]. 1 ♂, Forest Glen, June 1, 1913, (F. Knab), [U. S. N. M.]; 1 ♀, June 13, 1915, (W. L. McAtee); 1 ♀, Beltsville, May 28, 1916, (W. L. McAtee); 1 ♀, Rives, June 14, 1916, (L. O. Jackson), [all Biol. Surv.]. 1 ♀, Travilah, May, (F. C. Pratt), [U. S. N. M.].

DISTRICT OF COLUMBIA: 2 ♀, Washington, (D. H. Clemons); 1 ♀, Rock Creek, June 8, 1917, (C. H. T. Townsend), [all U. S. N. M.].

VIRGINIA: 2 ♀, Falls Church, June 2, 1916, (J. N. Knull and C. T. Greene), [U. S. N. M.; Div. Forest Ins.]; 1 ♀, June 3, 1913, (A. Busck), [U. S. N. M.]. 1 ♀, Langley, July 1902, (Wm. Palmer), [U. S. N. M.]. 1 ♀, Bluemont, June 13, 1916, (J. N. Knull), [U. S. N. M., Div. Forest Ins.]. 1 ♀, Dixie Landing, May 25, [U. of Minn.]. 2 ♀, Dixie Landing, [Wash. State College]. 4 ♀, Blacksburg, May to June 1916, [Leonard ex. Va. Crop Pest Comm.]. 1 ♀, Mount Vernon, June 4, 1916, (W. L. McAtee); 1 ♂, 2 ♀, May 27, 1916, (J. Silver); 1 ♂, near Plummer's Island, June 2, 1916, (W. L. McAtee), [all Biol. Surv.]. 1 ♂, 1 ♀, Marlatt, May 3, [U. S. N. M., ex Aldrich]. 2 ♀, Glencarlyn, May 31, (S. A. Rowher); 1, Newington, Fairfax County, May 31, 1911, (S. A. Rowher), [all U. S. N. M.]. 1 ♀, Petersburg, Chesterfield Co., June 1, 1917, (J. Bequaert), [A. M. N. H.]. 1 ♀, "Va." [U. of Ill.].

DELAWARE: 2 ♀, May 26, 1903; 1 ♀, June 9, 1895; 1 ♂, 2 ♀, no locality, [all Del. Agr. College].

NORTH CAROLINA: 3 ♂, 3 ♀, Black Mountains, [Brook. Mus.]. 1 ♂, 1 ♀ (in coitu) May 17, 1921, (C. S. Brimley), [N. Car. Dept. Agr.].*

⁶⁶ Recorded from Devon by Paxon (1908: 336); also from along Brandywine Creek, Chester County, by Johnson (1912: 109), the larvae, April 27th in wet decayed log, pupation occurred May 8th and the adults appeared May 30th.

* Eight specimens, Grimesland, mid-May, 1919, (C. S. Brimley), [N. C. Dep. Ag. Colln.; data from Brimley].

OHIO: 3 ♂, Wooster, June 6 to 17, 1907, [Ohio Agr. Exp. Sta.]; 2 ♀, June 20, 1917, (Q. Lowry), [N. H. Agr. College]. 1 ♀, Columbus, June 17, 1920, (Q. Lowry) [N. H. Agr. College]. 1 ♂, 1 ♀, Columbus, May 18 and 26, 1915; 3 ♂, June 2, 1915, (Don B. Whelan), [Mich. Agr. College]. 1 ♂, 1 ♀, Vinton, June 5 to 12, 1900, [Hine]. 1 ♂, 1 ♀, Newark, May 23, 1903, [Hine]. 1 ♀, "Ohio," June [Wash. State College].

INDIANA: 1 ♀, Lafayette, April 28, [U. S. N. M., ex Aldrich].

MICHIGAN: 1 ♀, Detroit, [U. S. N. M.].

ILLINOIS: 1 ♂, Muncie, June 13, 1905, [U. of Ill.]. 1 ♀, Freeport, on tree trunk, May 11, 1915, [U. of Ill.]. 1 ♂, Urbana, June 10 to 15, (R. C. Smith). 1 ♂, June 24, 1907, [Ohio Agr. Exp. Sta.].

***Chrysopilus tomentosus* Bigot**

1887. *Chrysopila tomentosa* Bigot, Bull. Soc. Zool. France, XII, p. 104.

1909. *Chrysopilus tomentosus* Kertész, Cat. Dipt., III, p. 327.

Blackish; palpi long, and with dense long, black hairs as has also the first antennal segment; mesonotum and abdomen more or less golden tomentose; halteres, femora and tarsi blackish; tibiae brownish yellow; wings strongly tinged with brownish, stigma dark brown.

Male.—Length, 5 to 6 mm. Head: Face grayish pollinose, bare on sides; antennae black, first segment noticeably larger than the other two and clothed all over with long, dense, black hairs; palpi long, reaching at least to base of antennae, black, with dense, long black hairs; proboscis blackish with a few short dark hairs; ocellar tubercle black, with long black hairs; cheeks also with rather numerous long black hairs.

Thorax: Mesonotum and scutellum dark brownish to blackish, clothed with fairly abundant, long, erect black hairs and with more or less appressed golden tomentum; pleura gray pollinose, a tuft of long black hairs on mesopleura and a similar tuft, often with a few pale hairs intermixed, on metapleura just in front of halteres; metanotum grayish pollinose, bare; halteres wholly blackish.

Abdomen: Blackish, often somewhat brownish or grayish pollinose, with sparse long pale hairs, especially on sides and with more or less appressed golden tomentum.

Legs: Coxae grayish pollinose, with long black hairs, which however are sometimes intermixed with pale ones; femora dark brownish to blackish, with a few pale hairs and some appressed yellowish tomentum; tibiae and metatarsi brownish yellow except on tip, remainder of tarsi dark brownish.

Wings: Strongly tinged with brownish, especially along front border; veins dark brown; stigma distinct, elongate, dark brown.

Female.—Bigot, in describing this species makes no distinction between the two sexes.

I have seen no females except the one noted from Seattle, Washington, which would agree with his description of the male and which therefore seemed to be referable to this species. This was

apparently determined by Melander, and unfortunately, I did not make a comparison of it with the male.

Specimens Examined: 49; 48 males, 1 female.

WASHINGTON: 1 ♂, Glenwood, Klikitat River, June 27, 1917, (A. L. Melander), [Melander]. 4 ♂, Forks, Clalam County, July 3 to 4, 1920, (E. P. Van Duzee), [Cal. Acad. Sci.]. 1 ♂, Seattle, June 19, 1920, [Cal. Acad. Sci.]. 1 ♂, 1 ♀, Seattle, [Univ. Wash.]. 1 ♂, Ephrata, Grand Coulee, June 26, 1902, [Wash. State College].

OREGON: 2 ♂, Hood River, June 30, 1917, (A. L. Melander), [Melander]; 2 ♂, June 2, 16, 1917, (F. R. Cole), [Cole].

CALIFORNIA: 1 ♂, Berkeley, May 8 to 24, 1915, (M. C. Van Duzee), [Van Duzee]. 3 ♂, Berkeley Hills, April 20, 1908, (E. T. Cresson, Jr.), [A. N. S. P.]. 2 ♂, Pacific Grove, May 7 to 8, 1906, (J. M. Aldrich), [U. S. N. M.]; 2 ♂, May 8, 1906, [U. S. N. M., ex Aldrich]. 1 ♂, San Francisco, May 12, 1915, (M. C. Van Duzee), [Van Duzee]; 1 ♂, (Holbel), [M. C. Z.]. 2 ♂, Los Cerritos, April 3, 1915, [Van Duzee]. 1 ♂, Stanford University, April 30, 1898, [Cole]; 2 ♂, April 30, 1910, [Cole]. 1 ♂, Palo Alto, May 11, 1895, (R. W. Doane), [Cole]. 1 ♂, San Diego, [Cole]. Blue Lake, Humboldt County, June 20 to 27, 1907, (J. C. Bradley), [C. U.]. 4 ♂, Felton, Santa Cruz Mountains, 300 to 500 feet alt., (J. C. Bradley), [C. U.]. 1 ♂, Monterey Co., July 2, 1896, W. M. Wheeler, [A. M. N. H.]. 1 ♂, Webber Lake, July 24, (Osten Sacken), [M. C. Z.]. 1 ♂, Half Moon Bay, April 12, 1920, (E. P. Van Duzee), [Cal Acad. Sci.]. 1 ♂, Bryson, Monterey County, May 20, 1920, (E. P. Van Duzee), [Cal. Acad. Sci.]. 1 ♂, Santa Barbara County, and 1 ♂, Santa Clara County, [U. S. N. M., ex Coquillett].

IDAHO: 2 ♂, Bellevue, June 25; 2 ♂, Albion, [all U. S. N. M., ex Aldrich].

I believe that I have been correct in referring Western males, with long black hairs on the first antennal segment and on the palpi, to this species. All specimens I have seen, seem to agree well enough with Bigot's description. The golden tomentum of the mesonotum and abdomen is often badly rubbed.

***Chrysopilus velutinus* Loew** (Pl. III, fig. 27)

1861. *Chrysopila velutina* Loew, Berl. Ent. Zeitschr., v, p. 316.

1909. *Chrysopilus velutinus* Kertész, Cat. Dipt., III, p. 328.

Wholly velvety black, except base of halteres, which is pale brownish, and the tibiae and first two or three tarsal segments which are yellowish or brownish yellow; wings brownish, most of the veins bordered with darker brown as in *thoracicus* Fab.

Male.—Length, 11 to 12.5 mm. Head: Visible portion of front and face black, semi-shining; sides of face with moderately thick, rather long, blackish hairs; palpi and proboscis black, the former with dense, long blackish hairs; antennae blackish, first segment with a number of blackish hairs which are longer below.

Thorax: Mesonotum and scutellum velvety black, sparsely covered with rather

short, fine, hairs which in some lights are brownish, in others blackish; pleura blackish, practically bare; a tuft of long yellowish hairs just in front of halteres; halteres black except base of stalk which is pale brownish.

Abdomen: Velvety black; above sparsely, on sides thickly covered with rather long, yellowish hairs.

Legs: Coxae and trochanters blackish, the former with long blackish hairs which on the first two pairs are located on the cephalic aspect and on the hind pair on the outer side; femora, except extreme tip, blackish, sparsely covered with short, appressed, golden hairs and longer, erect, pale or brownish hairs; tip of femora, the tibiae wholly, and the first two or three tarsal segments pale yellowish or yellowish slightly tinged with brownish.

Wings: Whole membrane strongly tinged with brownish; veins brownish, costal and subcostal cells and cell R_1 , except basal part, darker; most of the veins bordered with darker brown; membrane in anal area paler.

Female.—Length, 12 to 14 mm. Similar to male but with front velvety black.

This species comes closest apparently to *C. connexus* Johnson and as stated under that species badly rubbed specimens, which entirely lack the abdominal tufts of silvery pile are likely to be referred to *velutinus*. It should be noted that the type male in the Museum of Comparative Zoology collection has rather long, erect, dirty yellowish hairs over the entire abdomen, mesonotum and scutellum. These are longer on the sides of the abdomen than above and not quite so prominent on the mesonotum, due possibly to rubbing. The type ♀ has very short, somewhat brownish, less erect hairs on the thorax but the abdomen appears to be without such hairs, though the lack of them may be due, too, to rubbing. It may be after all that the original description and subsequent records of *velutinus* are based merely on badly rubbed specimens of *connexus* but it is impossible to prove it at this time.

Types.—A male and a female, in the Museum of Comparative Zoology Collection pinned together on one small cork block and labelled "type, Loew, *velutina*, nov. sp." Each specimen labelled separately "Ill." There is also besides these 1 female labelled "type, Loew, Ill."

Specimens Examined: 15: 10 males, 5 females.

NORTH CAROLINA: 1 ♂, 1 ♀, in copula, Craggy Mountains, (R. W. Leiby), June 8, 1916; 1 ♂, [N. Car. Dept. Agr.]. 4 ♂, 1 ♀, probably this species from the Black Mountains, June, [A. M. N. H.].

KENTUCKY:⁶⁷

⁶⁷ Recorded from this state by Osten Sacken in Cat. Dipt. N. A., ed. 3, p. 63, (1878).

FLORIDA: 1 ♂, "Fla." [A. N. S. P.]; 2 ♂, Guntown, Levy County, March, (P. Laurent), [A. N. S. P.].⁶⁸

MISSOURI: 1 ♀, labelled "C. Mo.," June, [U. S. N. M.].

ILLINOIS: 1 ♂, 2 ♀, [M. C. Z., types].

I have also seen two males without locality label determined as *velutinus* by Marten in the University of Illinois Collection, Nos. 6048 and 6006.

PTIOLINA Zetterstedt

1842. *Ptiolina* Zetterstedt, Dipt. Scand., I, p. 226.

1848. *Tyolina* Walker, List Dipt. Brit. Mus., I, p. 220 [evidently a mistake in spelling].

1867. *Eurytion* Jaennicke, Berl. Ent. Zeitschr., XI, p. 99.

Small to medium dark colored flies; eyes contiguous in the male, widely separated in the female; antennae with first two segments small, the third somewhat larger, suboval or irregularly conical with a short moderately thickened terminal style; tibial spurs 0 : 2 : 1; wings with the anal cell closed.

GENOTYPE: *Leptis obscura* Fallen, [the first species by designation of Frauenfeld.]

Ptiolina edeta Walker

1849. *Spania edeta* Walker, List Dipt. Brit. Mus., III, p. 489.

1908. *Ptiolina edeta* Williston, Man. N. Am. Dipt., p. 387.

I do not know this species. Walker's description follows:

"Mas. Atra, antennis nigris, pedibus piceis, alis sublimpidis ad costam obscurioribus.

"Body deep velvet-like black, hairy; eyes piceous; feelers and lip black; first and second joints of the feelers very short; third joint conical, broader and much longer than the first and second; spine as long as the third joint; legs piceous, clothed with short black hairs; wings nearly colorless, somewhat darker beneath the fore borders; wing ribs, veins, and poisers piceous. Length of the body two lines, of the wings 4 lines.

"St. Martin's Falls, Albany River, Hudson's Bay, Presented by G. Barnston Esq."

Mr. C. W. Johnson (1923: 70) has identified *P. edeta* Walk. He says "This species belongs to the genus *Ptiolina*. I have taken it on the "Alpine Garden" (5000 ft.), Mt. Washington, New Hampshire, July 4, 1914." I have not had an opportunity to study his material and can only say that it is a female and in the

⁶⁸ Recorded from St. Augustine by Johnson (1913: 54).

Boston Society of Natural History Collection. Coquillett (1900: 406) records the species as follows:

"*Spania edeta* Walker . . . Muir Inlet, June 12; Sitka, Alaska, June 16: Four specimens. Originally described from the Albany River, British America. Specimens are in the U. S. National Museum from the White Mountains, New Hampshire." I have been unable to check up on this determination.

***Ptiolina fasciata* Loew**

1869. *Ptiolina fasciata* Loew, Berl. Ent. Zeits., XIII, p. 164.

1905. *Spania fasciata* Aldrich, Cat. N. Am. Dip., p. 217.

I do not at present know this species. The type is gone, a single wing mounted on a bit of pasteboard on the pin is all that remains in the Museum of Comparative Zoology at Cambridge, Massachusetts. A translation of Loew's description follows:

"Male—cinereous, pale pilose, thoracic dorsum black-vittate, abdomen black-banded. Length of body about 5 mm., length of the wings a little over 4 mm.

"Cinereous, opaque, pile moderate and pubescence of whole body whitish or dilute yellowish. Antennae black, first two segments almost bare. Face bare. Palpi black, with short, white pile. Thorax with opaque black dorsal stripes, the median stripe towards the front margin of the thorax grayish and behind shortened, the median line not divided, lateral stripes short, on each side dissected with grayish at the suture, behind forming a black spot almost at the wing base. Scutellum cinereous, at the margin black. First abdominal segment, except the posterior margin, black; the remaining segments are each adorned with a single basal black band, in the middle of the abdomen dilated, strongly attenuated laterally. Feet shorter and stouter than in other species; extreme apex of the femora clay yellow; color at the base of the tibiae clay yellow, towards the apical most black. Hairs of the femora rather short, pubescence of the tibiae very short. Knob of the halteres black, stalk fuscous. Wings grayish, towards base somewhat luteous, stigma subfuscous, second submarginal cell long, the discal small, the second posterior petiolate.—Hudson's Bay Territory; Kennicot."

There is a male and a female from Colorado in C. W. Johnson's Collection determined as this species by Mr. Johnson, numbered 2158 and 2024 respectively.

***Ptiolina majuscula* Loew**

1869. *Ptiolina majuscula* Loew, Berl. Ent. Zeits., XII, p. 165, no. 66.

1905. *Spania majuscula* Aldrich, Cat. N. Am. Dip. p. 217.

Blackish, wholly gray pollinose; mesonotum with three dark brownish stripes; wings slightly tinged with brownish, an irregular darker band through center; legs brownish yellow.

Male.—(Type redescribed). Length, 6 mm. Head: Frontal triangle and face dark brown, light gray pollinose, sides of face bare; ocellar triangle prominent black slightly gray pollinose and with a number of short blackish hairs directed forward; eyes contiguous for but a short distance; palpi longer than distance from their insertion to the base of the antennae, tapering at tip, black; proboscis about two-thirds length of palpi, directed forward, black, both proboscis and palpi have numerous rather long hairs, pale and blackish intermixed; antennae blackish, with first two segments with short black hairs above, third segment somewhat irregular conical with a black style tapering to a point at apex and slightly longer than rest of antennae taken together.

Thorax: Mesonotum grayish pollinose with a broad dark brown median stripe, narrowly divided along median line, the lateral border broadly dark brownish and between these on each side an area of same color from just behind humeral calli almost to ocellar callosities, narrowly interrupted at suture by the pollen; scutellum dark brownish, slightly gray pollinose and slightly shining; scutellum and mesonotum both with numerous erect blackish hairs; metanotum same as scutellum, but wholly bare; pleura gray pollinose, bare except for the propleural hairs which are rather pale; halteres with stem yellowish brown, the knob blackish.

Abdomen: Wholly gray pollinose but subshining in certain lights and with sparse fine pale appressed hairs (a large piece is gouged out of the dorsum comprising the second, third and nearly all of the fourth segments).

Legs: Coxae blackish, gray pollinose, the hairs pale and fine; remainder of legs wholly dark brownish, except the extreme tip of the femora and the basal half of the front and middle tibiae which are somewhat tinged with brownish yellow; tarsi not noticeably darker than rest of legs.

Wings: More or less tinged with pale brownish, but distinctly darker through center of wing from base of stigma which is diffused and dark brown.

Female.—(Here described for the first time). Length, 8 to 9 mm. Differs from the male chiefly as follows:—Head: Front just above antennae about one and one-third times as wide as the eye, dark brown, grayish pollinose wholly clothed with numerous short rather stiff black hairs which become longer and more erect on the vertex and occiput; ocellar triangle considerably more flattened, with hairs as on the front; palpi brownish yellow, apparently slightly darker towards tip due to the hairs being pale on basal two-thirds and blackish on apex. Thorax: Mesonotum with lateral borders gray pollinose, the hairs shorter than in the male; besides those on the propleura there are numerous very fine, pale, moderately long hairs on the whole of the metapleura and on the sternopleura along the cephalic and caudal borders. Legs: Coxae as in male, remainder of the legs more of a uniform yellowish brown, the tarsi not appreciably darkened. Wings: Somewhat broader and anal cell not narrowed quite so much at the border of the wings as in the male.

Type.—A single male in the Museum of Comparative Zoology from "Hudson's Bay Territory; Kennicott." The discal cell is open at the apex, the vein which would ordinarily close it being

represented in each wing only by a short stub arising from the second basal cell.

Allotype.—The female is described from two specimens in the U. S. National Museum collected on the Harriman Expedition by Kincaid on Popoff Island, Alaska, July 10, 1899. These were determined by Coquillett as *Leptis pruinosa* Bigot and are the specimens referred to by him in Proceedings of the Washington Academy of Sciences, II, p. 406, 1900. I compared these with the type male in Cambridge, Mass. and was at once convinced of the specific identity of the two sexes. One of these specimens has the vein closing the apex of the discal cell represented only by a short stub as in the type; in the other this cell is wholly closed as is undoubtedly normal in this species.

Note.—This species may form a new genus because of the comparatively long antennal style, the narrowed fourth posterior cell and the distinctly open anal cell. However the third antennal segment is apparently much like that of *P. atra* Staeger and the number of tibial spurs is correct. I therefore leave it for the present in the genus in which Loew originally placed it.

SPANIA Meigen

The regional species *Ptiolina edeta* Walker was originally described in *Spania*. Altho *Ptiolina fasciata* Loew and *P. majuscula* Loew, were, as well as *P. edeta* all listed under *Spania* in Aldrich's Catalog, Williston in his "Manual," includes *Spania* in the key to genera but in the appendix, page 387, states that "an examination of the type of *Spania edeta* in the British Museum discloses the fact that it is a true *Ptiolina*; *Spania* is not known to occur in North America."

Mr. C. W. Johnson (1923: 69) however records the capture of a single male of what he determines as *Spania nigra* Meigen var. *americana* n. var. The variation from typical *nigra* is apparently only a slight difference in the method of origin of the two upper veins arising from the apex of the discal cell. Verrall⁶⁹ states however that the venation of the European *nigra* is exceedingly variable and I am inclined to believe that, unless other more constant differences can later be found Mr. Johnson has probably turned up the

⁶⁹ Brit. Flies, V. p. 3-8, (1905).

real European *nigra* in this country. His specimen is from Witch Hole Pond, near Bar Harbor, Maine, June 21, 1921. Under date of June 1, 1928, Mr. Johnson wrote me that in the same lot of "sweepings" he had later found another specimen which agreed in venation with the more typical specimens of the European *nigra*, but was, for some reason unexplained to me, still inclined to question its exact specific identity.

Spania is most closely related to *Ptiolina* from which it may be distinguished I believe by the characters given in the generic key on page 55. The type is *Spania nigra* Meigen.

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EXPLANATION OF PLATES

(These drawings are not made to scale)

Plate I

ANTENNAE

- | | |
|---|---|
| Fig. 1.— <i>Dialysis rufithorax</i> Say. | Fig. 5.— <i>Rhagio costatus</i> Loew. |
| Fig. 2.— <i>Atherix variegata</i> Walker. | Fig. 6.— <i>Symphoromyia hirta</i> Johnson. |
| Fig. 3.— <i>Hilarimorpha mikii</i> Williston. | Fig. 7.— <i>Coenomyia ferruginea</i> Scopoli. |
| Fig. 4.— <i>Xylophagus lugens</i> Loew. | |

Plate II

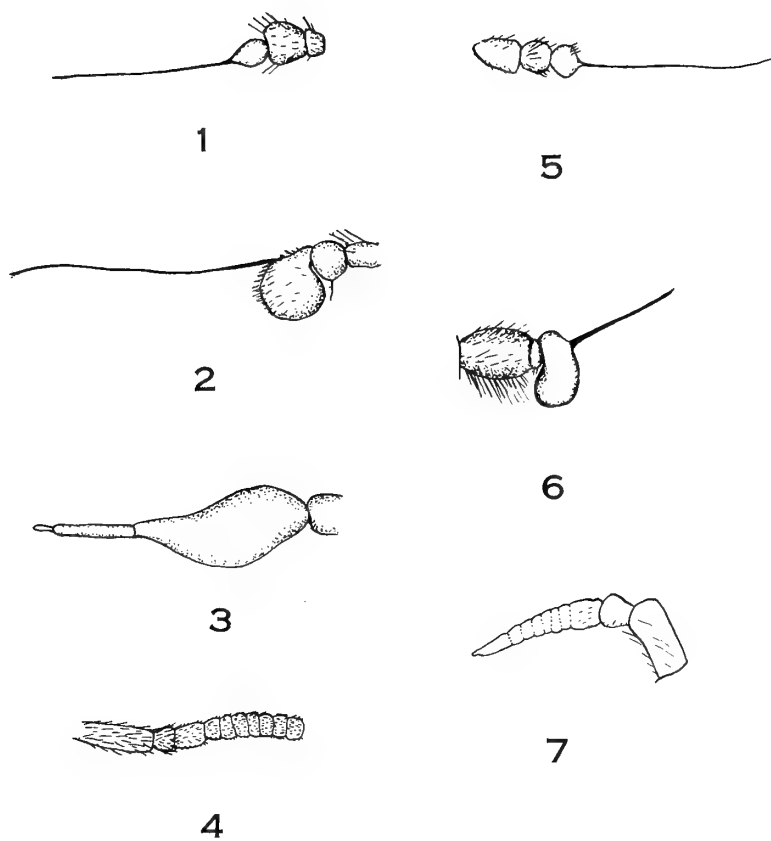
WINGS

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| Fig. 8.— <i>Coenomyia ferruginea</i> Scopoli. | Fig. 13.— <i>Rhagio vertebratus</i> Say. |
| Fig. 9.— <i>Dialysis elongata</i> Say. | Fig. 14.— <i>Rhagio incisus</i> Loew. |
| Fig. 10.— <i>Xylophagus lugens</i> Loew. | Fig. 15.— <i>Dialysis rufithorax</i> Say. |
| Fig. 11.— <i>Rhagio plumbeus</i> Say. | Fig. 16.— <i>Rhagio punctipennis</i> Say. |
| Fig. 12.— <i>Rhagio costatus</i> Loew. | Fig. 17.— <i>Chrysopilus foedus</i> Loew. |

Plate III

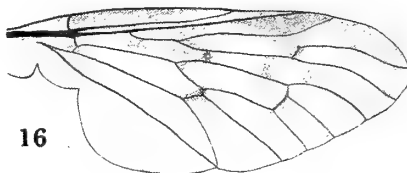
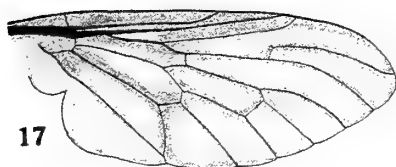
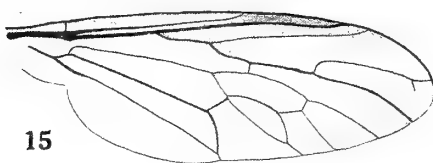
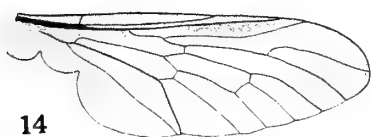
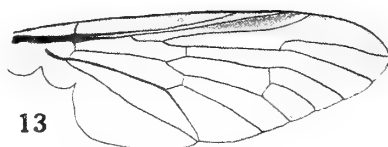
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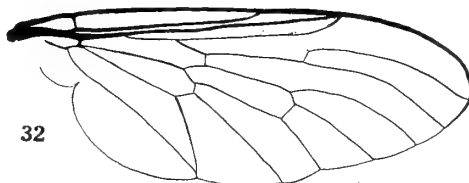
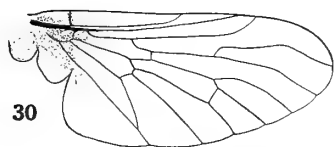
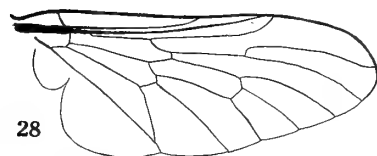
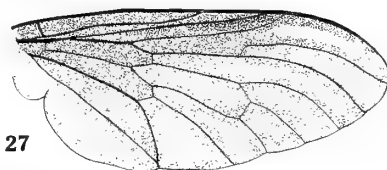
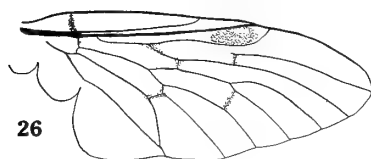
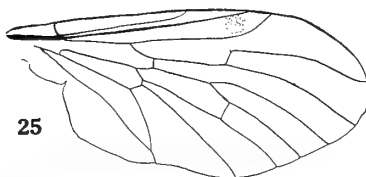
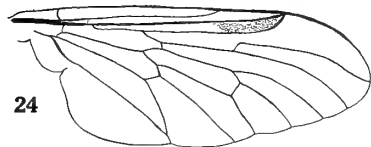
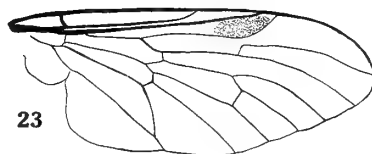
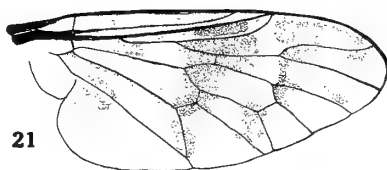
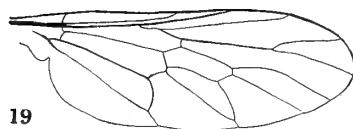
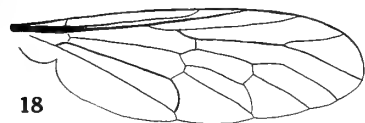
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| Fig. 18.— <i>Rachicerus fulvicollis</i> Haliday. | Fig. 26.— <i>Chrysopilus griffithi</i> Johnson. |
| Fig. 19.— <i>Xylomyia pallipes</i> Loew. | Fig. 27.— <i>Chrysopilus velutinus</i> Loew. |
| Fig. 20.— <i>Xylomyia aterrima</i> Johnson. | Fig. 28.— <i>Chrysopilus proximus</i> Walker. |
| Fig. 21.— <i>Atherix variegata</i> Walker. | Fig. 29.— <i>Chrysopilus thoracicus</i> Fabricius. |
| Fig. 22.— <i>Rhagio mystaceus</i> Macquart. | Fig. 30.— <i>Chrysopilus basilaris</i> Say. |
| Fig. 23.— <i>Chrysopilus modestus</i> Loew. | Fig. 31.— <i>Chrysopilus quadratus</i> Say. |
| Fig. 24.— <i>Chrysopilus fasciatus</i> Say. | Fig. 32.— <i>Chrysopilus ornatus</i> Say. |
| Fig. 25.— <i>Chrysopilus rotundipennis</i> Loew. | |



LEONARD—NORTH AMERICAN RHAGIONIDAE







INDEX

The names of new species are followed by the name of the author. Names cited in synonymy are given in *italics*.

- | | | | |
|---|-----|---|-----|
| abdominalis (Xylophagus, <i>Erinna</i>) | 23 | <i>cinctus</i> (<i>Nemotelus</i>) | 21 |
| <i>Agnotemyia</i> (see <i>Dialysis</i>) | | <i>cinereibarbis</i> (<i>Coenomyia</i>) | 7 |
| albibarbis (Rhagio, <i>Leptis</i>) | 89 | <i>Chrysopilus</i> | 129 |
| albicornis (Rhagio, <i>Leptis</i>) | 90 | (see also <i>andersoni</i> , <i>anthracinus</i> , | |
| aldrichi (<i>Dialysis</i>) | 58 | <i>basilaris</i> , <i>bellus</i> , <i>connexus</i> , <i>davisi</i> , | |
| <i>americana</i> (<i>Arthropeas</i>) | 17 | <i>dilatus</i> , <i>fasciatus</i> , <i>flavibarbis</i> , <i>foe-</i> | |
| <i>americana</i> (<i>Spania nigra</i>) | 176 | <i>dus</i> , <i>griffithi</i> , <i>humilis</i> , <i>infuscatus</i> , | |
| <i>americana</i> (<i>Xylomyia</i> , <i>Xylophagus</i> , | | <i>lucifer</i> , <i>modestus</i> , <i>nudus</i> , <i>ornatus</i> , | |
| <i>Subula</i> , <i>Solva</i>) | 37 | <i>pilosus</i> , <i>proximus</i> , <i>quadratus</i> , <i>ro-</i> | |
| <i>americanus</i> (<i>Xylophagus</i>) | 63 | <i>tundipennis</i> , <i>testaceipes</i> , <i>thoraci-</i> | |
| <i>andersoni</i> (<i>Chrysopilus</i>) Leonard | 131 | <i>cus</i> , <i>tomentosus</i> , <i>velutinus</i>) | |
| <i>anthracinus</i> (<i>Chrysopilus</i>) | 133 | <i>Coenomyia</i> | 6 |
| <i>Antodoxion</i> (see <i>Rachicerus</i>) | | (see also <i>fasciata</i>) | |
| <i>Apogon</i> (see <i>Vermileo</i>) | | <i>comstocki</i> (<i>Vermileo</i>) | 71 |
| <i>Arthroceras</i> | 52 | <i>concaus</i> (Rhagio) Leonard | 94 |
| (see also <i>leptis</i> , <i>pollinosum</i>) | | <i>connexus</i> (<i>Chrysopilus</i>) | 136 |
| <i>Arthropaeas</i> (see <i>Arthropeas</i>) | | <i>costatus</i> (Rhagio, <i>Leptis</i>) | 95 |
| <i>Arthropeas</i> | 17 | <i>crucis</i> (<i>Stratiomys</i> , <i>Sicus</i> , <i>Musca</i>) | 7 |
| (see also <i>americana</i> , <i>jonesi</i> , <i>magna</i> , | | | |
| <i>sibirica</i>) | | <i>davisi</i> (<i>Chrysopilus</i>) | 137 |
| <i>aterrima</i> (<i>Xylomyia</i>) | 38 | <i>decorus</i> (<i>Xylophagus</i> , <i>Erinna</i>) | 22 |
| <i>Atherix</i> | 81 | <i>degeeri</i> (<i>Vermileo</i>) | 73 |
| (see also <i>pachypus</i> , <i>varicornis</i> , <i>var-</i> | | <i>diadema</i> (Rhagio) | 81 |
| <i>iegata</i> , <i>vidua</i>) | | <i>Dialysis</i> | 56 |
| <i>Atherix</i> (see <i>Symphoromyia</i>) | | (see also <i>aldrichi</i> , <i>discolor</i> , <i>dispar</i> , | |
| <i>aurea</i> (<i>Sicus</i>) | 7 | <i>disparilis</i> , <i>dissimilis</i> , <i>elongata</i> , <i>fasci-</i> | |
| <i>australis</i> (<i>Musca</i>) | 7 | <i>civentris</i> , <i>lauta</i> , <i>rufithorax</i>) | |
| | | <i>dilatus</i> (<i>Chrysopilus</i>) | 137 |
| <i>basilaris</i> (<i>Chrysopilus</i> , <i>Leptis</i>) | 133 | <i>dimidiatus</i> (Rhagio, <i>Leptis</i>) | 97 |
| <i>bellus</i> (<i>Chrysopilus</i>) | 135 | <i>discolor</i> (<i>Dialysis</i> , <i>Triptotricha</i>) | 60 |
| <i>bicolor</i> (<i>Sicus</i>) | 7 | <i>dispar</i> (<i>Chrysopilus</i>) | 157 |
| <i>bispinosa</i> (<i>Tabanus</i>) | 7 | <i>dispar</i> (<i>Dialysis</i>) | 61 |
| <i>Bolbomyia</i> | 74 | <i>disparilis</i> (<i>Dialysis</i> , <i>Triptotricha</i>) | 61 |
| (see also <i>nana</i>) | | <i>dissimilis</i> (<i>Dialysis</i> , <i>Triptotricha</i>) | 63 |
| <i>bocsii</i> (Rhagio, <i>Leptis</i>) | 91 | | |
| <i>brunneipennis</i> (Rhagio) Leonard | 92 | <i>edeta</i> (<i>Ptiolina</i> , <i>Spania</i>) | 173 |
| <i>californicus</i> (Rhagio) Leonard | 93 | <i>elongata</i> (<i>Dialysis</i> , <i>Stygia</i> , <i>Anthrax</i> , | |
| | | <i>Lomatia</i> , <i>Agnotemyia</i>) | 63 |

- errans* (*Stratiomys*) 7
Erinna (see *Xylophagus*)
Eurytion (see *Ptiolina*)
- fasciatus* (*Chrysopilus*, *Leptis*) 138
fasciata (*Ptiolina*, *Spania*) 174
fasciata (*Xylomyia*, *Xylophagus*,
Subula, *Solva*) 40
fasciatus (*Xylophagus*, *Subula*, *Erinna*) 23
fasciventris (*Dialysis*, *Triptotricha*) 65
ferruginea (*Coenomyia*, *Musca*, *Sicus*) 7
filia (*Atherix*) 118
flavibarbis (*Chrysopilus*) 141
flava (*Chrysopilus*) 157
flavomaculata (*Xylomyia pallipes*)
Leonard 43
flavoniger (*Rhagio*, *Leptis*) 97
foedus (*Chrysopilus*) 142
fulvicollis (*Rachicerus*) 11
fumipennis (*Leptis*) 157
- Glutops* 49
(see also *singularis*)
gracilis (*Rhagio*, *Leptis*) 98
gracilis (*Xylophagus*, *Erinna*) 26
grandis (*Stratiomys*) 7
griffithi (*Chrysopilus*) 144
griseola (*Leptis*) 113
- Heliomyia* (see *Chrysopilus*)
Hilarimorpha 75
(see also *mikii*, *obscura*, *pusilla*,
singularis)
Hilaromorpha (see *Hilarimorpha*)
hirta (*Leptis*, *Rhagio*) 122
honestus (*Rachicerus*) 12
hoodianus (*Rhagio*, *Leptis*) 100
humilis (*Chrysopilus*) 145
- ibis* (*Atherix*) 84
Ibisia (see *Atherix*)
imperfecta (*Platycnema*) 77
inamoena (*Solva*) 36
- incisus* (*Rhagio*, *Leptis*) 101
infuscatus (*Chrysopilus fasciatus*)
Leonard 141
intermedius (*Rhagio*, *Leptis*) 103
- jonesi* (*Arthropeas*) 19
- lauta* (*Dialysis*, *Triptotricha*) 67
Leptis (see *Rhagio*, also *Chrysopilus*)
leptis (*Arthroceras*, *Arthropeas*) 52
limbatus (*Rhagio costatus*) Leonard
. 96
limbipennis (*Rhagio*, *Leptis*, *Leptipalpus*) 104
longicornis (*Xylophagus*, *Erinna*) 27
longipes (*Atherix*) 85
lucifer (*Chrysopilus*) 146
lugens (*Xylophagus*, *Erinna*) 28
- Macroceromys* (see *Xylomyia*)
macroleon (*Stratiomys*) 7
maculifer (*Rhagio*, *Leptis*) 104
magna (*Arthropeas*) 19
major (*Stratiomys*) 7
majuscula (*Ptiolina*, *Spanis*) 174
melaena (*Atherix*) 78
melancholica (*Sylvicolae*) 81
Misgomyia (see *Bolbomyia*)
mikii (*Hilarimorpha*) 75
modestus (*Chrysopilus*) 146
modesta (*Symphoromyia*) 82
mystaceus (*Rhagio*, *Leptis*) 105
Mythicomyia 55
- nana* (*Bolbomyia*, *Misgomyia*) 74
niger (*Rachicerus*) Leonard 13
nigra (*Spania*) 177
nitidus (*Rachicerus*) 14
nitidus (*Xylophagus*, *Erinna*) 31
Nodutis (see *Atherix*)
nudus (*Chrysopilus*) 148
- obscura* (*Hilarimorpha*) 76
obscura (*Leptis*) 173
obscuripennis (*Rachicerus*) 14

obscuripennis (Rhagio, *Leptis*, *Leptipalpus*).....111
 ochraceus (Rhagio, *Leptis*).....111
olens (*Musca*).....7
opacus (*Vermileo*, *Pheneus*).....72
ornatus (*Chrysopilus*, *Leptis*).....149

pachypus (*Atherix*).....81
Pachystomus (see *Xylophagus*)
palatina (*Stratiomys*).....7
pallida (*Coenomyia*).....7
pallidifemur (*Xylomyia*).....45
pallipes (*Xylomyia*, *Subula*, *Solva*) 40
palpalis (Rhagio, *Leptis*).....112
par (*Leptis*).....158
parens (*Xylomyia*, *Subula*, *Solva*) 44
Pelechoidocera (see *Atherix*)
persequus (*Xylophagus*, *Erinna*)...32
pilosus (*Chrysopilus*) Leonard...152
pleuralis (Rhagio, *Leptis*).....113
plumbeus (Rhagio, *Leptis*).....113
plumbea (*Symphoromyia*).....80
pollinosum (*Arthroceras*).....53
pollinosus (Rhagio) Leonard...116
propinqua (*Leptis*, *Chrysopila*)...155
proximus (*Chrysopilus*, *Leptis*)...155
pruinosis (Rhagio, *Leptis*).....117
Psammorycter (see *Vermileo*)
Ptiolina.....173
 (see also *edeta*, *fasciata*, *majuscula*)
punctipennis (Rhagio, *Leptis*)...118
pusilla (*Hilarimorpha*).....77

quadratus (*Chrysopilus*, *Leptis*)...157

Rachicerus.....10
 (see also *fulvicollis*, *honestus*, *niger*,
nitidus, *obscuripennis*, *ruficollis*)
reflectens (*Xylophagus*, *Subula*,
Erinna).....32
reflexa (*Leptis*).....157
Rhachicerus (see *Rachicerus*)
Rhagio.....86
 (see also *albibarbis*, *albicornis*,
boscii, *brunneipennis*, *californi-*
 MEM. AM. ENT. SOC., 6.

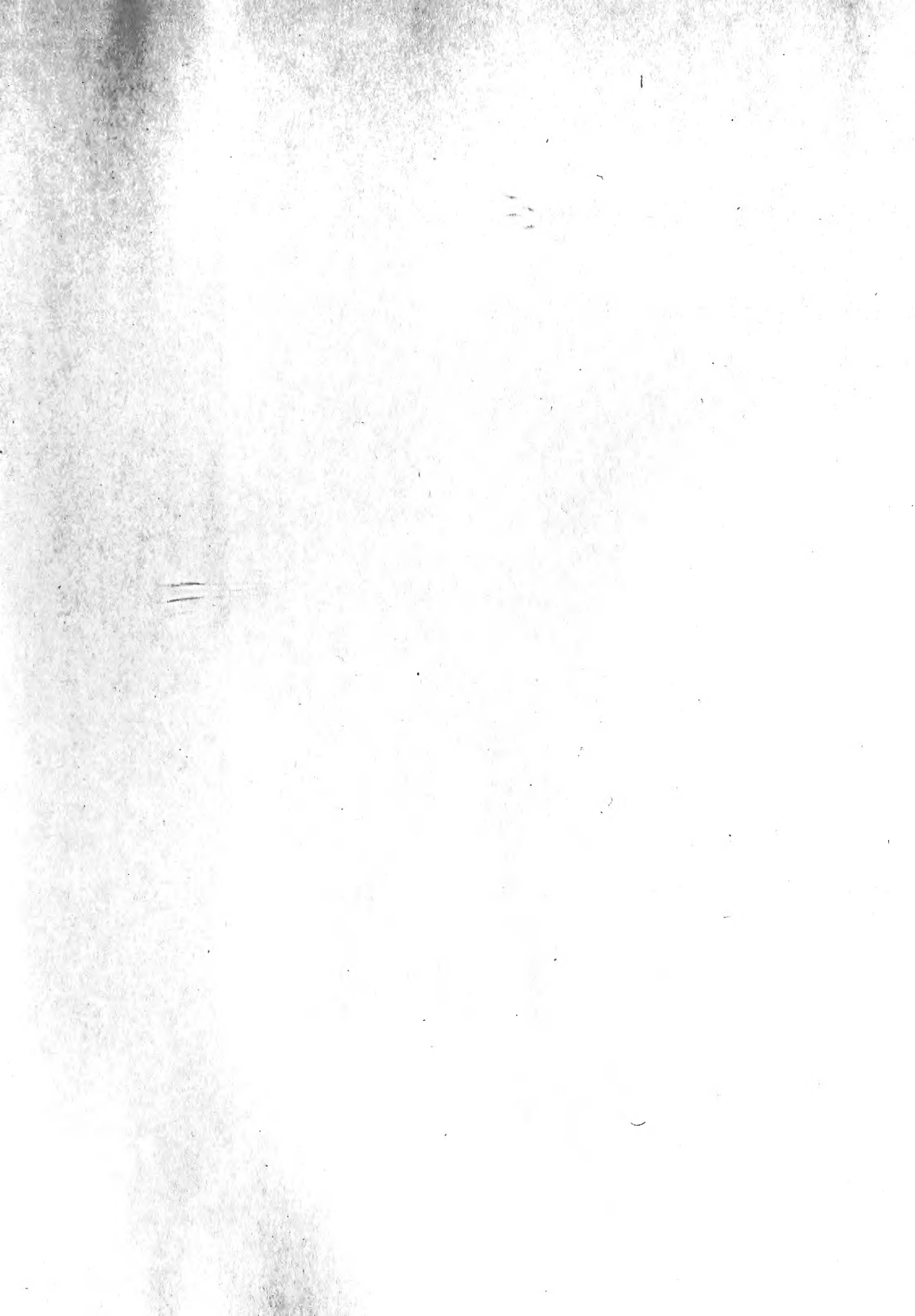
cus, *concauus*, *costatus*, *diadema*,
dimidiatus, *flavoniger*, *gracilis*,
hoodianus, *incisus*, *intermedius*,
limbatus, *limbipennis*, *maculifer*,
mystaceus, *obscuripennis*, *ochra-*
ceus, *palpalis*, *pleuralis*, *pollinosus*,
pruinosis, *punctipennis*, *termi-*
nalis, *vertebratus*)
Rhagio (see *Vermileo*)
Rhyphonorpha (see *Rachicerus*)
ruficollis (*Rachicerus*).....11
rufipes (*Xylophagus*, *Erinna*).....32
rufithorax (*Dialysis*, *Leptis*, *Triptotricha*).....68

scapularis (*Leptis*, *Rhagio*).....122
scopolacea (*Musca*).....86
serveilli (*Leptis*, *Chrysopilus*)...149
sibirica (*Arthropeas*).....17
simillima (*Leptis*, *Chrysopila*)...155
singularis (*Glutops*).....49
singularis (*Hilarimorpha*).....75
Solva (see *Xylomyia*)
Spania.....176
 (see also *americana*)
Subula (see *Xylomyia*)
stigmatalis (*Microsanja*).....76
Styrex (see *Chrysopilus*)
Sylvicola (see *Atherix*, *Chrysopilus*,
Rhagio)
Symphoromyia.....77
 (see also *plumbea*)

terminalis (Rhagio, *Leptis*).....121
tenthredinoides (*Xylomyia*, *Subula*,
Solva).....45
testacea (*Stratiomys*).....7
testaceipes (*Chrysopilus*).....165
thoracicus (*Chrysopilus*, *Leptis*)...166
tibialis (*Pheneus*).....73
tomentosus (*Chrysopilus*).....170
triangularis (*Xylophagus*, *Erinna*)..35
Triptotricha (see *Dialysis*)
Tyolina (see *Ptiolina*)

<i>unguiculata</i> (<i>Stratiomys</i>)	7	<i>Xylophagus</i>	21
<i>varicornis</i> (<i>Atherix</i>)	82	(<i>see also</i> <i>abdominalis</i> , <i>decorus</i> , <i>fasciatus</i> , <i>gracilis</i> , <i>longicornis</i> , <i>lugens</i> , <i>nitidus</i> , <i>reflectens</i> , <i>triangularis</i>)	
<i>variegata</i> (<i>Atherix</i>)	82	<i>Xylomyia</i>	36
<i>velutinus</i> (<i>Chrysopilus</i>)	171	(<i>see also</i> <i>americana</i> , <i>aterrima</i> , <i>fasciata</i> , <i>flavomaculata</i> , <i>pallidifemur</i> , <i>pallipes</i> , <i>parens</i> , <i>tenthredinoides</i>)	
<i>Vermileo</i>	70		
(<i>see also</i> <i>comstocki</i> , <i>degeeri</i> , <i>opacus</i>)			
<i>vertebratus</i> (<i>Rhagio</i> , <i>Leptis</i>)	122		
<i>vidua</i> (<i>Atherix</i>)	85		





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